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ENGLISH AND AMERICAN SHIP YARDS.

MR. W. I. BABCOCK OF THE CHICAGO SHIP BUILDING CO., WRITES OF HIS OBSERVATIONS AT THE RECENT CONGRESS IN ENGLAND— A BROAD AND INTELLIGENT DISCUSSION OF A SUBJECT THAT NOW INTERESTS THE NATION.

Editor Marine Review:—In giving you briefly some results of my observations at the recent International Congress of Naval Architects and Marine Engineers in England, I shall not speak particularly of the magnificent reception given to the foreign delegates, nor of the warmth and cordiality of the greetings accorded us, which have already been fully described in your paper, nor go into details of the arrangements of yards and shops or particular tools, but treat the matter in its broader aspects.

Any comparison between English and American ship yards must take into account at the very outset the great difference between the two countries as maritime powers. The United States, with nearly eighty millions of population, is essentialy a self-contained country. The coast line is a mere fringe along its edge, and the vast majority of its people have not only never seen the ocean, but take little interest in it. Since the war the vast energies of its people have been principally devoted to the internal development of the country, to the building of its railroad systems for internal communication, to the subjugation of the soil from its virgin condition to the use of man, especially in the vast empire beyond the Mississippi, and to the establishment of tremendous manufacturing industries whose chimneys now dot the whole broad land. In all this the maritime industries have languished from neglect, the ship yards of the country are very few and far between, and, but for the wise navigation laws requiring all coastwise business to be carried on only in home-built vessels, would scarcely exist at all, and the number of skilled men is limited. The natural consequence has been that the amount of work in the few yards we have has been a very variable quantity; a few orders happening to come together make the yards, for a few months, crowded with work and finding it difficult to secure men enough; then, with bare stocks and empty shops for a time, the men scattered, even a large proportion of the foremen, draughtsmen and office force necessarily laid off until returning work again demands their services. All this inevitably has a very serious effect on the internal economy of any yard, reduces the efficiency of the organization, demoralizes the men, and largely increases the cost of building, when the work can be had.

In Great Britain, on the contrary, we have forty millions of people living on a couple of islands off the coast of Europe. With the inhabitants of the mainland they have often been at war for the last thousand years, and from their isolated position great fleets have always been absolutely necessary to them, so that they could get at their enemies as well as repel invasion of their own country. Naturally a strong and dominant race, and overcrowded at home, they have found an outlet in colonies all over the globe, with which it has been necessary to keep up communication, and this could be done by water alone. An inventive and manufacturing people, whose products have been in continually increasing demand as their colonies extended and civilization spread over the waste places of the world, they have gradually become a nation of traders and artisans, withdrawing more and more from agricultural pursuits, until now the greater part, yes, three-fourths, of the very food they eat comes from the foreigner. If the ships that bring it were interfered with in time of war, England would starve to death in short order. National existence itself thus depending on control of the sea, ship building and ship owning are among the great industries of the country. The coast line is dotted with ship yards from Southampton to the Clyde, the keels of their ships plough every sea from the Arctic to Cape Horn, and wherever they go the strong arm of England protects them with a war fleet such as the world never saw before.

As the completed ship is the sum of all human knowledge and endeavor, embodying in its complex structure the products of every trade and industry, while its operation and the business it carries on enlist the attention and efforts of all the financial and business interests, every man, woman and child in Britain appreciates the importance of ship building and follows its fortunes with intelligent interest and solicitude. To me, the most striking thing that I saw in England during my recent visit was this universal interest, manifested in many ways. However strange it may seem to an American, the glamour of royalty still dazzles the son of the soil, and the fascination of a title or a decoration is yet strong upon him, and they are his most longed for and cherished rewards. Now, not only has every chief constructor of the British navy for many years been knighted, but this year the distinction has been conferred on the chief engineer as well; the sessions of the recent congress of Naval Architects and Marine Engineers were opened in person by the heir to the throne; and, highest honor of all to British eyes, even the aged Queen herself showed her interest in the profession which has made her country what it is, by receiving the members of the congress at Windsor Castle.

But all this is, of course, the bright side of the picture, from the British point of view. If it had no reverse, the hopes of those of us who are working and praying to build up American interests, to get back to our own country its lost carrying trade, now mostly done by England, to awaken a sentiment here that will react on congress and force it to make the appropriation for that navy which all considerations of national interest and honor require that we should have, would surely be doomed to disappointment. Self-preservation itself impels us to accomplish these results, for, as Capt. Mahan has so well shown, all history teaches that strength upon the sea is absolutely necessary to make and keep a nation prosperous and powerful.

Now, the ability not only to build good ships but to build them as cheaply as any competing nation can, is one of the prime essentials, and it is, therefore, a great pleasure to be able to say that it is my deliberate opinion, after careful inspection of the various yards that were so freely thrown open to us, and of some others not on the regular programme of the congress, that, given work enough to keep our yards occupied all the time, our larger and more modern yards could build ships and make money at English prices, and this notwithstanding the fact that the wages paid on the Clyde—taken from an official list I obtained in Glasgow—average but 55½ per cent. of the wages we pay. This is due to the much greater use of labor-saving machinery in our yards, to their better arrangement for handling material, to, in many respects, better tools, and, last but by no means least, to the fact that we manage our own business, that the union and the walking delegate are not all-powerful with us, that master and man work together in America with mutual respect and esteem, that our mechanics are better and brigher workmen, more intelligent and taking more pride in their work, and our managers are always ready to try anything new in the hope it will be better than the old way.

The Britisher is very conservative. He believes in sticking to the bridge which has carried him safely over, and does not take kindly to new tools or new methods. A citizen of a great empire, secure in his belief not only that the sun never sets on British soil, but that the reason for it is that the sun knows his business and has no time to waste in seeing what other nations are doing, he listens, with politeness, it is true, but with ill-concealed disdain, to any description of new devices, and remains absolutely serene in his opinion that his own way is the only right way, his own tools the best tools. Consequently, many of the improved labor-saving appliances which are common with us, have no place on the other side. His yards are mostly long established and have grown from small beginnings, with the inevitable result of a more or less patchwork appearance and inconvenient arrangement. Land is valuable, and few of his yards have enough of it and are crowded in consequence, without sufficient room for the work. Naturally he does not want to throw out tools which are still in good condition because new and better ones are now on the market, even if he could be made to see their superiority, which he can not.

But, in my judgment, the worst feature today in the British yards is the tremendous power of the labor unions, and the universal antagonism of the men to the masters. The exactions and obstructions of all kinds that are thrown about the work by these unions are almost inconceivable. When it comes to such a pass that an employer is deprived of the use of a crane for months at a time because two classes of his men can not agree as to which class needed repairs belong; when a boiler manufacturer is forced to absolutely shut down his works for weeks because of a similar dispute among his men; when strikes are ordered on the most trivial pretexts, and the leaders of the unions are always doing all that they can to keep up an antagonism between the men and the employers, even going so far as to keep men continually moving from one place to another for fear that they will become too friendly with the bosses; when in some places the men insist on electing their own foreman, who holds his position, therefore, at their pleasure; when the rule of the union is that one man shall run only one tool, though his hardest work may be to keep himself awake through the day if he is running a lathe set for a long cut in the morning, and that every tool must be run by a mechanic, no matter whether unskilled cheap labor would be sufficient or not; it is very evident to anyone who has any knowledge whatever of industrial operations that the cost of the work must be excessive. It is not too much to say that the tyranny of the trades unions has been the principal reason why the industrial supremacy of England, in many lines of trade, has already vanished, and in others is rapidly declining. Germany today sells more manufactured articles in England than England sells in Germany. English exports of iron and steel, hardware and cutlery, linens and woolens, are less than one-half now of what they were twenty years ago. Many industries have been driven out of England entirely, and "ruined by strikes" is the only fitting comment.

Already signs are not wanting that the Britisher will wake up some fine day and find that his superiority in ship building—about the only thing left to him—has vanished also. Next year the two largest ships on the Atlantic will have been built in Germany. Foreign orders for warships, which formerly all came to England, are now placed to a considerable extent in France and Germany, and even in Italy, and the Japanese have recently ordered two cruisers in this country, as we all know. The United States has outstripped England already in steel making, and ship material sells here today at lower prices than over there.

England is the richest nation in the world, but, largely on account of labor difficulties at home, her capital seeks investment in foreign countries rather than in her own. I was assured that not one ship yard in England today could interest new capital to any extent to make needed improvements. Probably this is an exaggeration, but the fact is undeniable that when the revival of American ship building and ship owning comes, when wise legislation enables us to again take our proper place on the sea, and American capital becomes available for the establishment of new and great ship yards, modern in every respect, then we can build ships cheaper than anywhere else in the world, and still pay the highest wages. We are only a very short distance behind in the race even now.

Chicago, Sept. 1, 1897. W. I. BABCOCK.

Hauser & Leitz, Chicago contractors, have about completed the 500-foot extension of the south harbor pier at Manitowoc.

Suspending Licenses.

Local inspectors of steam vessels on the lakes seem to be stirring themselves in the matter of punishing captains for violation of the pilot rules. The announcement from Milwaukee that the local inspectors at that port, Messrs. Wm. Fitzgerald and D. W. Chipman, have suspended licenses of the captains of the big passenger steamers Virginia and Christopher Columbus, will undoubtedly have a beneficial effect among vessel masters generally, no matter what the criticism may be regarding the justice of their action. In view of fact that complaint regarding the accident was instituted by Capt. Smith of the Columbus, it is surprising that the licenses of both men were suspended. In a report to Supervising Inspector Galwey regarding the accident, the Milwaukee inspectors say:

"We have to report the conclusion of an investigation of charges preferred by Capt Robert Smith of the steamer Christopher Columbus against Capt. Henry E. Stines of the steamer Virginia, for violation of rule 6 of the pilot rules of the great lakes and tributary waters, thereby causing a collision between the above named steamers on the afternoon of July 18, 1897, near the outer end of the harbor piers at this port. After thoroughly investigating this complaint we are unable to conclude whether Capt. Stines had violated rule 6 or not, on account of the conflicting testimony given by the witnesses, but we do believe that had the masters of these steamers paid proper attention to the rules provided for the navigation of the lakes a collision would have been impossible. We believe, to say the least, that it was taking chances of a collision for Capt. Stines of the Virginia to pass the Columbus in the river, where a delay of a very few minutes would have rendered passing the Columbus unnecessary, as he would have had plenty of room in Lake Michigan, where he could have passed in safety. We are of the opinion that had Capt. Smith of the Columbus desired the Virginia not to have passed him, a proper application of signals required by rule 6 would have prevented the passing and collision. The rules require that under all circumstances when steamers are navigating in narrow waters their movements must be governed by care and caution, and the pilots of steamers are permitted and required to stray from these rules when by so doing a collision can be prevented. We are forced to believe the masters of these steamers were not careful and cautious in allowing their steamers to approach so near one another when a strict application of the rules would have prevented it. The collision was trivial, but might have been worse, and there are too many lives at stake on these steamers to permit of any careiessness on the part of the masters in construing and acting in compliance with rules. We therefore consider that both were equally to blame, and have suspended their licenses as masters and first-class pilots for thirty days, commencing Sept. 1, 1897."

Marblehead Life Savers.

The retirement from the life-saving service of Capt. Lucien M. Clemons, keeper of the Marblehead (Lake Erie) station, recalls an important chapter in the history of this service on the lakes. The first gold medals ever awarded by the United States government for the rescue of shipwrecked persons were received by residents of Marblehead, who were not then in the service, although the Marblehead station was one of the first established on the lakes, and was equipped shortly after the accident here referred to. The circumstances leading to this substantial recognition of heroism make an interesting and thrilling narrative. Capt. Lucien M. Clemons and his brothers, A. L. and Hubbard, were the rescuers.

The schooner Consuelo, a craft of 450 tons burden, which had made a voyage across the Atlantic to Liverpool in the early sixties, left Cleveland April 30, 1875, bound for Buffalo, laden with block stone. The vessel carried a crew of six men and a woman cook, but had proceeded only a short distance when a storm arose, and forced her to seek shelter. Accordingly she was headed for the south shore of Kelly's island, about 12 miles from Sandusky and 3 miles north of the rocky shores of Marblehead. This course proved a fatal error. Between Kelly's island and Marblehead the water is nowhere deeper than 30 feet, and consequently "a nasty sea" comes up very quickly in a breeze. The Consuelo's cargo had been hastily stowed, and either through carelessness or to facilitate unloading, rollers had been left under some of the massive blocks of stone in the hold. The vessel pitched and tossed so that the blocks and the whole cargo shifted, and suddenly, almost without warning, the schooner gave a lurch and foundered. The captain, three men and the cook were lost, but Mate Donahue and one of the sailors succeeded in clinging to the spars, where they were sighted from Marblehead by the Clemons brothers, who went to their rescue. They started in an open rowboat. Time and time again it seemed as if their frail craft must certainly swamp, and just as they were about exhausted, they reached the two sailors, who were clinging to the wreckage, and picked them up. But the danger was by no means past, as the strength of the two men was entirely spent and the storm was increasing. It is likely that none of the occupants of that little boat would ever have reached shore alive had not the tug Winslow come to their assistance and landed them safely on Kelly's island.

It was this exhibition of bravery that caused the government to select Capt. Clemons for the position of keeper of the Marblehead station, which was established about a year afterward. He was also honored with one of the medals referred to above, which was accompanied by a letter of special commendation from the treasury department. Similar letters and medals were received by the brothers, A. J. and Hubbard M. Clemons.

A man named Linden, at Naples, has invented a boat with fins projecting from each side which by a combination with steel springs are made to propel the boat from the motion of the waves. The more the boat pitches, the faster she goes and the regular ocean swell on a calm day is said to be enough to propel her.

The Marine Review has prepared in neat oak frames cards containing the schedule of time required to be run between certain points in the St. Mary's river under the speed limit of seven miles an hour. When hung in a pilot house, distance and time may be readily noted from these cards, as the type is large. They will be sent by express to any address at $1 each, or may be had upon application at 409 Perry-Payne building, Cleveland, for 65 cents each.

The Vessel, not the Underwriter, Pays the Loss.

Although it may be said that from an insurance standpoint the so-called McCurdy-Prime syndicate of Chicago is getting considerable advertising out of its correspondence with government officials and vessel owners on the subject of means for avoiding losses to vessel property, the fact remains that the principals of the Chicago combination have entered into this subject in a most thorough manner and are proceeding along lines that would seem to be entirely within the scope of underwriters' affairs. In a letter to Capt. Geo. P. McKay of the Lake Carriers' Association, Geo. L. McCurdy of Chicago writes very interestingly of recent lake accidents and their relation to the principle of insurance "that after all it is the vessel that pays to the loss." He says:

"In connection with our correspondence on various subjects pertaining to aids to navigation, I have thought of writing to you about the results of our investigations this season, for I believe that in them we have found some of the causes of disasters, and that many of these disasters could have been prevented seems to be a foregone conclusion. I cite for example the disaster to the steamer Britannic, which ran into the gates of one of the locks in the Welland canal. I wrote to Capt. Alvin Neal, the owner, and asked him if the experience arising out of this disaster suggested to him an idea how to prevent a repetition. Mr. Neal investigated this matter and found, to his surprise, that neither the master nor the engineer of the Britannic had a copy of the rules of the Canadian government governing navigation of the Canadian canals. Section 5 of these rules reads as follows: "It shall be the duty of all masters or persons in charge of any steamboat or other vessels, or of any raft or barge in approaching any lock or bridge, to ascertain for themselves by careful observation whether the lock or bridge is prepared and ready to receive them or allow them to pass through, and to be careful to stop the speed of any such steamboat or other vessel or raft with lines and not with the engine wheel." In the case of the Britannic steam was used to stop the progress of the vessel, and we find that just because steam was used we have to pay something like $4000 as a result of this steamer running into the gates. Capt. Neal feels that if the master had understood the rules the disaster would not have occurred. This then is one of those accidents that could have been prevented by seeing that each master is furnished with a copy of the rules, or of the sections which more directly apply to navigation in the locks.

"Can you wonder, then, that we feel somewhat exercised at this waste of money, in which it must be conceded that the owners of the lake vessels have fully as much interest as the underwriters, for we must start with this idea firmly fixed in our minds, that the underwriters are simply the custodians of a fund created by the vessel owners who pay to the companies premiums from which alone may be expected the necessary funds with which to pay for disasters. If these funds are exceeded, one can see the result. It has been repeated year after year in the history of the lake marine; the rates of premiums are increased and the form of policy is made less liberal, with the natural sequence that the owners are dissatisfied, as the higher rates have usually come in what are called hard times for the vessels. It was with an idea to firmly establish a system of low rates and liberal form of policy that we introduced our syndicate, feeling that by an intelligent supervision of the losses, the causes of disasters, menaces to navigation, drainages and leakages, which have so vexed this inland marine business, that we could continuously offer to the lake owners what they need—good indemnity at cheap rates. This will account then for my diligence in trying to learn first why these accidents occur, secondly to try to have adopted such ideas as may be approved after being well considered, to minimize the chance of loss.

"You probably noted the announcement that we concluded, upon investigation of this Welland canal accident, to furnish all captains with copies of the principal sections of rules relating to the navigation of the canal. This will be done by a delivery service at Port Colborne and Port Dalhousie. We are proceeding in matters of this kind not with the idea of dictating to vessel owners or vessel masters. On the contrary we are hoping that our course will be commended if it results in a reduction of losses and the saving of so much out of the premium fund, which, as I have already said, is after all created by the vessels themselves. The same idea prompted our suggestion regarding the maintenance of a signal service at Johnson's point, Sault river, which we propose to establish at our own expense if satisfactory arrangements can be made with the government officials and vessel owners."

Cargo Records of Lake Ships.

Another of the steamers owned by A. B. Wolvin of Duluth, the new Empire City, built by the Cleveland Ship Building Co., has established a new cargo record. With the addition of 1 per cent. for moisture, which does not appear in bill of lading weights, but which is always added in records kept by the Review, the Empire City's first cargo of ore out of Two Harbors aggregates 6,296 net tons, or 21 net tons more ore than has ever before been carried in a single cargo on the lakes. The Andrew Carnegie has also exceeded the 6,000-ton mark in an ore cargo delivered at Cleveland recently. Following is a corrected table of largest cargoes:

Iron Ore—Steamer Empire City, owned by A. B. Wolvin of Duluth, 5,622 tons gross, or 6,296 net, Two Harbors to Cleveland, draft of 17 feet 2 inches; schooner Amazon, James Corrigan of Cleveland, 5,603 tons gross, 6,275 net, Duluth to Ashtabula, draft of 16 feet 8 inches; schooner Polynesia, James Corrigan of Cleveland, 5,477 tons gross, 6,134 net, Duluth to Fairport, draft of 16 feet 8 inches; Andrew Carnegie, Wilson Transit Co. of Cleveland, 5,425 tons gross, 6,076 net, Two Harbors to Cleveland, draft of 17 feet 4 inches.

Grain—Steamer Crescent City, A. B. Wolvin of Duluth, 225,000 bushels of corn, equal to 6,300 net tons, South Chicago to Buffalo, draft of 17 feet; schooner Amazon, James Corrigan of Cleveland, 217,000 bushels of corn, equal to 6,076 net tons, Chicago to Buffalo, 16 feet 6 inches draft; steamer Crescent City, A. B. Wolvin of Duluth, 318,000 bushels of oats, equal to 5,088 net tons, Duluth to Buffalo.

Coal—Schooner Aurania, John Corrigan of Cleveland, 5,187 net tons bituminous, Toledo to Milwaukee; steamer Andrew Carnegie, Wilson Transit Co. of Cleveland, 4,997 net tons of bituminous, Cleveland to Sheboygan, draft of 15 feet 2 inches.

Reorganization of Navy Personnel.

Ira N. Hollis, professor of engineering in Harvard University, presents at length in the Atlantic Monthly for September his novel proposition for the reorganization of the personnel of the navy. This is the proposition referred to in the last issue of the Review as under consideration by Acting Secretary Roosevelt of the navy. The adoption of the scheme would place the engineer corps of the navy upon substantially the same footing as the engineer corps of the army, as a corps d'elite, open to all graduates of the naval academy according to their efficiency in special studies. Prof. Hollis' suggestions are as follows:

1. To make the course at the naval academy the same for all cadets, with a strong emphasis on engineering.
2. To give all graduates, except those entering the marine and construction corps, commissions as ensigns in the line.
3. To require all line officers to spend their first six years at sea, equally divided between responsible duties on deck and in the machinery department.
4. To permit any line officer to specialize in engineering during his second six years as a commissioned officer, and at the end of this time to transfer him to the engineer corps after thorough examination in engineering.
5. To require at least one officer of the engineer corps on every ship, and to place under his charge all that pertains to machinery on board, including the men required for engineering matters.
6. To give all watch duties connected with repairing and driving machinery to line officers, under the direction of the chief engineers.
7. To promote all officers of the line and engineer corps at the same rate and to the same ranks.
8. To make the total number of line officers and engineers together what it is now by law, with a minimum of about one hundred officers in the engineer corps.
9. To regulate the flow of promotion by permitting a limited number of officers to retire after thirty years' service.
10. To provide a "reserve list" for officers who do not reach command rank young enough to be effective.
11. To promote all ensigns after three years' service in that grade.
12. To transfer to the line all officers of the present engineer corps who have held their commissions less than twelve years.
13. To establish a general staff in whose hands shall be placed all matters connected with the preparation for war.

Prof. Hollis entered the navy as an engineer cadet in 1874 and was in the service for nineteen years. His arguments in favor of the change, as presented in the magazine article, are of an exhaustive kind.

"The navy discontent is really only part of a great national problem," Prof. Hollis says, "an indication of a realignment of men to grapple with new forces. Many parallels exist in history, even in the history of navies. The same kind of a struggle and readjustment occurred three or four hundred years ago, and will no doubt occur again in the coming centuries. All problems involved in the change of the relative importance of individuals are delicate, and the navy should have the aid and support of every good citizen in reaching a satisfactory solution of the difficulties connected with the personnel. It is our due that we may have efficient ships, and theirs that they may have every cause for pride in the service and for gratitude to their country. In the education of our young officers we are clinging to memories and traditions. We are lashed hard and fast to a sentiment. Seamanship and sails are still considered the proper training for men who will command our ships twenty years hence. We are passing through a period of transition when the organization of neither officers nor men quite fits the ships which are designed on theory and whose weaknesses must be developed by war. The modern ship is a machine, and seamanship in it can not be the same as it was in Nelson's or even Farragut's time. Its casualties can not be foreseen, but they will be of a nature to require the services of men with engineering education. We do not know what will happen on a battleship in action, but we do know that the engineer is needed to keep it in an efficient condition. The men in the engine and boiler rooms belong to the fighting machine, and must work in harmony with the line officers toward the same ends, if we are to attain the highest qualities in our ships. As it is, the differences between the two are driving from the service many graduates of the academy. In the entire separation of the two corps, the country is found to be the loser, and no ship will be studied as a unit until they are brought together. The line officers fear that the engineers wish to command the ships. Let the commanding officers become engineers, and let engineers rule on ships, then all fears will be dispelled, and the navy will quickly become a unit."

Signals Regarding Draft of Water.

When accidents in the vicinity of Ballard's reef, Detroit river, were quite numerous, a short time ago, it was proposed to station men in small crafts of some kind on the river to warn vessels below Amherstburg and above Ballard's reef of the draft of water, and to stop deep-laden vessels when the water was too low to admit of safe passage. This proposition came from the underwriters, who were considering the question of bearing the expense of such service. It was thought that damages from vessels grounding, which are very heavy in the case of steel ships, could be reduced in this way, but now that groundings in the river occur less frequently, the proposition has not been acted upon. It would seem, however, that a service of this kind, requiring two or three small vessels constantly on the river, would not be an improvement over the present system of signals on the coal docks, unless the men in the small boats were in some way authorized to stop the big carriers that seem disposed at all times to load to the very last inch and to take chances in dangerous places when the water is low. The Lake Carriers' Association has for some time past maintained a system of signals to indicate low water in the vicinity of Ballard's reef. These signals—flags by day and lights by night—are displayed from the Sandwich dock of the Cuddy-Mullen Coal Co. above the reef, and from the Amherstburg dock of the same company below the reef. Imformation regarding the draft of water is telephoned to these places by Duff and Gatfield, who maintain a water gauge for the purpose of furnishing such information to the vessels.

Passing Signals in Fog.

Editor Marine Review:—I have noticed several articles relating to blowing passing signals in fog upon the lakes, and desire to say that I think the statements of Westcott and one or two others in this matter are entirely out of place, taking into consideration the fact that about 99 per cent. of the masters in steam vessels on the lakes, most of whom may be assumed to be as well qualified to judge as the gentlemen referred to, stated before the White bill was passed that such passing signals were proper and necessary, and the rule was made at their request. Passing signals were used in fog on the lakes for years. In the spring of 1894 the supervising inspectors took the sailing profession up here by surprise, by deciding that the law permitted passing signals only between vessels that were in sight of each other. The question was much discussed that season among masters, and taken up in their meetings in the fall, and almost to a man the masters stated that they had used passing signals in fog the same as before, because they did not dare to try to pass without signals; and I never heard one man actually in service taking any other position than that passing signals were most necessary. Three men, none of them engaged in handling steamboats, were all that I heard oppose the signals, and the most active of these three frankly stated that his chief objection was that masters might depend too much on the passing signals and run too fast.

The White law recognizes the point made by Westcott, that sound can not always be located with accuracy. Rule 15 provides, to begin with, that every vessel shall in thick weather go at moderate speed; then it provides that if a steamer hears a fog signal apparently anywhere within four points from right ahead, she shall at once reduce her speed to bare steerageway and navigate with caution. So navigating with caution, vessels are required to use passing signals, which 99 per cent. at least of practical men handling steamers said were so indispensable that they used them even in the face of a construction from the department that it was contrary to rule.

If, instead of criticising the White law, its plain rules are lived up to, and all the precautions which it lays down for thick weather are observed, we would have fewer collisions than on any other waters as much navigated as our lakes, for it was adopted as the best set of rules that practical pilots could suggest as the result of actual experience, and is all right.

Cleveland, Sept. 1, 1897. C. E. BENHAM.

Railroads in the United States.

Advance sheets of Poor's Manual for 1897, which have just been issued to the press, give the following comparative totals regarding the operation of railways in the United States:

	1896.	1895.	Increase or decrease.	Increase or decrease per cent.
Miles railroad operated..	180,891.19	179,153.62	1,737.57	0.97
Tons freight moved.....	773,868,716	755,799,883	18,068,833	2.40
Freight mileage	93,885,853,634	88,567,770,801	5,318,082,833	6.00
Passengers carried	535,120,756	529,756,259	5,364,497	1.01
Passenger mileage	13,044,840,243	12,609,082,551	435,757,692	3.46
Earnings from freight..	$770,424,013	$743,784,451	$26,639,562	3.58
Earnings from passengers	265,313,258	260,929,741	4,383,517	1.68
Miscellaneous earnings.	89,894,754	87,681,245	2,213,509	2.52
Total gross earnings.	1,125,632,025	1,092,395,437	33,236,588	3.04
Net earnings	332,333,756	323,196,454	9,137,302	3.23
Earnings per ton per mile	0.821 cent.	0.839 cent.	*0.018 cent.	2.15

*Decrease.

The share capital of the 180,000 miles of lines is stated to be $5,373,-187,829, an increase for the year of $191,065,820, or 3.7 per cent., but the funded debts in the aggregate fell off $179,085,969, to $5,461,856,598, a loss of 3.17 per cent., indicating the powerful influence of the reorganization process through which so many companies have passed involving in numerous instances a severe scaling down of obligations. Other forms of indebtedness on the part of the companies are stated to be $444,449,969, an increase of $25,994,877, and the total shares, bonds and debts outside of current accounts reached the enormous sum of $11,279,544,386, a gain of $37,974,728, or about one-third of 1 per cent. As measured by their stocks and bonds alone, the cost per mile of the roads making these returns was $59,732, against $60,188 in 1895.

Notwithstanding the period of depression covered by the statistics, the total gross earnings increased $33,236,588, or 3 per cent., and the freight business alone showed a gain of 3½ per cent., or $26,639,562. The tons of freight moved in the year were 773,868,716, a gain of 18,068,833 tons, or 2.4 per cent., while the aggregate tons moved one mile were no less than 93,885,000,000, or some 5,318,000,000 greater than the corresponding movement in the preceding year, the gain being equivalent to exactly 6 per cent. The unfavorable feature was the continued decline in the average rates, the earnings per ton per mile from all freight tonnage transported being 0.821 cent, against 0.839 cent in 1895, a decerase of 0.018 cent, or 2.15 per cent. The difference this involves when the enormous volume of tonnage transported is taken into account is one that would make a very radical change in the general financial position of a large number of companies.

Not a little of the expense in brazing is due to the cost of removing the brass which has stuck to the metal where it is not wanted. The removal of this brass is usually attained only by patience and diligent filing. Now comes to the aid of the brazier that unique mineral, graphite, which is not affected by acids, alkalies, heat or cold. A note from the Joseph Dixon Crucible Co., Jersey City, N. J., claims that braziers who have made use of Dixon's pure flour of graphite pronounce it worth its weight in gold. A sample will be forwarded to any address upon application without charge.

Luce's "Seamanship" is a book that is specially suited to assist young officers of the naval reserve. It is being used by naval reserve organizations all over the country. It is a standard work, selling at $10, and will be mailed to any address at that figure by the Marine Review, 409 Perry-Payne building, Cleveland.

Senator Frye Discusses the Distributing Tariff Section.

Senator W. P. Frye of Maine, who enjoys the reputation of being the best-posted member of the senate on shipping matters, has been heard from in regard to section 22 of the tariff bill, which nobody wants to father, and which is now in the hands of the attorney-general for interpretation. He answers the charge of Senator Chandler, that the clause was inserted by legislative trickery in which the steamship companies took part, and in doing so declares that he does not want to see any attempt to help the American ship handicapped by connection with the railways, on account of the prejudices which they have aroused.

"I have great confidence in Senator Chandler," Mr. Frye says, "and ordinarily I give credence to any statements made by him, because I know he is honest, industrious and a conscientious seeker after the truth; but in this case, as to some of his facts, he is mistaken, and certain of his insinuations are not well founded. He asserts that the American Line, assisted by an astute lawyer, undertook to induce the conference committee on the tariff bill to reform section 22, and, by innuendo, connects that company with the railroads in the procurement of the law as it now stands. He says the result was secured by an 'elaborate trick,' and that, of course, intelligent men like these conferees must have been cognizant of it when they adopted it. Now, the senator knows, personally and by repute, all of the members of the committee, and can not, in good conscience, charge them with being ignorant dupes or cunning contrivists of elaborate tricks. As to facts, there was a serious and long-continued attempt to induce the senate finance committee to adopt and report to the senate a substitute for section 22, the purpose being to have it in such shape that it would be effectual in event congress should conclude to resort to discriminating duties for the revival of our foreign carrying trade, as recommended by the national convention of Republicans and indorsed by its candidate for the presidency, without any further legislation other than the abrogation of our commercial treaties.

"While the proposed amendment, as printed, contained the 10 per cent., as urged before the committee, the duty was not to exceed 6 per cent., to be levied upon non-dutiable as well as dutiable goods. Failing to secure a report of this amendment to the senate, it was then advocated very earnestly before the conferences, but failed of success. This attempt was open, was advocated in the presence of several senators not of the committee at different hearings, and preparations made for its discussion in the senate. There had been in all tariff laws for a great many years a provision for a discriminating duty of 10 per cent. additional on all dutiable goods brought into the country in foreign ships, except from those countries with which we had treaties, etc. Of course, the law was a dead letter, for we had commercial treaties with all civilized nations—I think thirty-nine in all. The committee recommended that this provision be amended so that free as well as dutiable goods be included, and that the per cent. be reduced, but did not name the reduction. They did this knowing that it would not affect a single imported article unless congress thereupon would repeal certain laws and abrogate all these treaties. Their purpose was simply to have the law in the best possible condition whenever, if ever, the congress should, after full consideration, determine upon discriminating duties.

"Of how this amendment to section 22 was secured, I know nothing, but that it was by a 'legislative trick,' in the playing of which the conferees were participants with knowledge, I do not believe, nor do I believe that any senator, other than Mr. Chandler, harbors for a moment such a suspicion. I am, and have been for many years, intensely and actively interested in the restoration of the merchant marine engaged in the foreign carrying trade. It seems to me that our present condition in this regard is a national humiliation. While I appreciate the immense benefits our railroads have conferred upon the country, I understand the prejudices they have aroused, and this attempt to effect something for our ships ought not to be handicapped by any imaginary copartnership, nor by any implication that the friends of the shipping have joined hands with anyone to perpetrate a 'legislative trick.'"

It seems to be the opinion that the effect of discussion of this troublesome clause in the new tariff will be the bringing to the front prominently of the general project for discriminating duties on foreign vessels. Senator Elkins, whose name has long been prominently connected with this idea, will undoubtedly renew the battle vigorously in December. The plan has apparently increased in favor of late, and it may be no easy matter to persuade congress that it is best to allow the present system of reciprocity treaties to remain. Referring to this tendency of opinion favorable to discriminating duties, one of the eastern papers that has always been a strong advocate of this idea says:

"The coming of prosperity so closely upon the heels of the new tariff, after four years of business gloom under a lower tariff system, has undoubtedly developed a strong public sentiment not only in favor of protection in itself but of a wider application of the protective principle than ever before. The growing sentiment in the south toward protection for raw material, in the production of which America's natural advantage is equal to that of any country on the globe, has been one of the notable signs of the times. It is not unlikely that the proposal to apply the protective principle to the business of ocean transportation will receive wide support, and those who maintain that it would not be profitably applied to that industry can not too soon make up their case. A small and relatively decreasing percentage of the tonnage of the world is now done under the American flag. Statistics show that our ocean trade remains about stationary, while the tonnage of the world is steadily increasing. But it is evident, on the other hand, that American capital and enterprise are every year controlling more and more of the world's commerce, although as yet by no means our fair share. A glance at the list of ocean liners will show how much more largely American capital is represented on the seas than the flying of the flag indicates. The International Navigation Co., which is largely an American concern, divides its fleet among three flags. Of the American Line, the St. Paul and St. Louis, built in the United States, and the Paris and the New York, built abroad, but admitted to American registry, fly the American flag. The Berlin and the Chester of the same line sail under the British flag. The Antwerp, Red Star line, owned by the International company, sails under the Belgian flag; but the profits of the three fleets practically go into American pockets. The Manhanset line, having four ships sailing under the British flag, is, with the exception of one small holding, entirely an American property. The Atlantic Transport line, sailing seven ships under the British flag, is almost exclusively owned here. William R. Grace & Co. of New York own a fleet of four ships which fly the British flag. A good deal of the stock of the New York and Mediterranean and the International line steamers is also held in the United States; and so it appears that American enterprise and capital is not so badly represented in the ocean commerce of the world as is our national flag."

Bids on Sault River Improvements.

In Detroit, Tuesday, Col. G. J. Lydecker, engineer in charge of St. Mary's river improvements, opened bids for dredging and blasting in four sections of the river, involving a total expenditure of nearly half a million dollars. There were fourteen bidders for the work. The four lowest bidders were Arthur H. Vogel of Milwaukee, at 34 cents per cubic yard, or $35,700 for the entire A section of 105,000 yards; M. Sullivan of Detroit, at 52 cents for each of 198,000 cubic yards, B section, or $102,960; H. W. Hubbell & Co. of Saginaw, at 94 cents on section C, or $193,744 for the 58,600 yards. On section D the $2.14 bid of Hickler Bros. of the Soo was the lowest. For this last section the sum of $150,000 is available. Whether it should be used was to depend on the size of the bid. The bid of Hickler Bros. is not considered unusually high, and it is probable that they will get the contract.

The first or A section will be the work at Round island shoal No. 1, about 1¼ miles northwest of the old Round island light-house. The present 300-foot channel must be widened to 800 feet and deepened to 23 feet. The second section is at Round island shoal No. 2, 1 mile northeast of the old light-house. The present 300-foot channel is also to be made 800 feet wide and 23 feet deep. At the third section the shoals obstructing the upper approach to St. Mary's falls canal are to be improved by a channel 1,000 feet wide and 21 feet deep. At the fourth section, at the middle Neebish, the present channel will be widened 30 feet and deepened to 21 feet in certain parts.

The specifications call for the completion of section A by Oct. 31, 1898, section B by Dec. 31, 1898, section C by August 31, 1898. The money for these three is to come out of the St. Mary's river, Hay lake and ship-canal appropriations. The estimated cost of the entire job was $320,000. The three lowest bids aggregate $332,404. The following table gives the bids in full:

	Item A.	Item B.	Item C.	Item D.
F. M. Knapp, Racine	$0.50	$0.87	$....	$....
C. E. Mitchell & Co., Ludington	.48	.77	....	....
W. A. Starke, Milwaukee	...	.73	1.29	....
A. H. Vogel, Milwaukee	.34	.75	1.50	....
L. P. & J. A. Smith Co., Cleveland	.60	.60	1.60	2.50
H. W. Hubbell & Co., Saginaw	....	.74	.94	....
Hickler Bros., Soo	1.00	.78	1.25	2.14
M. Sullivan, Detroit	.98	.52	1.23	2.75
James Rooney, Toledo	.60	.60	....	....
Carkin, Stickney & Cram, Detroit	.44	.67	1.50	5.25
Lydon & Drews Co., Chicago	.40	.76	1.36	....
J. R. McCollum, Port Huron	.44	.62	....	....
G. H. Breymann & Bros., Toledo	.44	.54	1.40	2.25
Hingston & Woods, Buffalo	.52	.60	1.00	2.60

Dry Dock Question in the Navy.

The dry dock board appointed by Acting Secretary of the Navy Roosevelt to investigate the government's dock property and report upon the best means of providing the navy with increased facilities on the Atlantic station, is now in session at the Brooklyn navy yard. The board is composed of Commodore F. M. Bunce, Commander F. E. Chadwick and Assistant Naval Constructor R. B. Dashiell. Constructor Dashiell sailed last week to Europe for the purpose of examining a new floating dock at Hamburg, and Civil Engineer Parkes has been ordered to serve as an additional member of the board. It is quite certain that this board will report in favor of more docks, but whether they will be of timber, stone, concrete or simply floating docks, and the sites favored by the members of the board, are matters entirely conjectural. There is a general feeling of antipathy against timber docks, the government's experience having been most unfortunate with structures of this class. Several members of the board are known to favor the floating docks, and the report of Constructor Dashiell after his return from abroad will have great influence in the final decision of the board. Floating docks are favored for their cheapness, their availability for employment on the Atlantic coast and the ease with which they can accommodate disabled vessels.

According to reports of the Chicago Board of Trade, east-bound shipments of freight of all kinds by lake out of Chicago during the week ending August 28 reached a total of 199,138 tons, or more than 30,000 tons in excess of the shipments of any previous week in the history of the port. A greater increase is expected during the present week, as the movement of grain during forty-eight hours ending Monday night was enormous. Exactly 5,065 cars of all sorts were received, including 3,585 cars of corn. Shipments aggregated 2,400,000 bushels of all kinds of grain, including 119,000 bushels of wheat, 1,666,000 bushels of corn, and over 500,000 bushels of oats. The receipts in bushels were: Wheat, 175,500; corn, 1,244,000; oats, 558,000. The remainder was rye and barley.

A dispatch from Washington says: "Vesselmen will be glad to know that a strong effort is on foot to codify and consolidate laws relating to shipping on the lakes, which are in many respects a picturesque patchwork of unnecessary requirements and ridiculous technicalities. Commissioner of Navigation Chamberlain has done much to improve the situation, having secured the repeal of more than a dozen vexatious and absurd laws during his term of office. It is believed that the codification of the laws would result in materially relieving vessel owners and masters from annoyance and at the same time would add to the protection afforded to the traveling public."

Assurance of a Strong Freight Market.

A strong lake freight market with advancing rates until the close of the season is now assured to vessel owners. New sales of iron ore within the past month have aggregated full half a million tons. A large part of this is ore on dock, and the great bulk of the remaining ore involved in the sales was immediately covered by lake freight contracts, but these contracts tie up to the ore trade a certain amount of tonnage that will not enter into competition for other lines of freight, and the market is, of course, benefited accordingly. It is admitted also that on the basis of present sales the entire ore movement of the season will be equal to that of 1896—practically 10,000,000 tons—so that the big grain movement and the shortage in soft coal shipments that must be made up with a rush during the two closing months of the season would seem to give absolute assurance of highly profitable freights. Ore dealers are now asking an advance in prices suited to cover added lake freights, and if the iron market corresponds to the general improvement in business, it would not be surprising to hear of additional sales of ore at the higher prices.

These conditions in the ore market, coupled with the heavy grain movement out of Chicago, have already caused an advance in ore freights of 15 to 20 cents a ton over the lowest figures of the season, although practically no grain has as yet been moved from the head of the lakes and the soft coal situation is just as it has been for several weeks past under strike conditions. Northwestern grain has been a week to ten days late in getting into Duluth. It will begin to move next week, probably just on the eve of a settlement of the coal strike, and another marked advance in lake freights will be the inevitable result.

Ship Yard Matters.

It is now quite probable that lake ship yards will again be well supplied with orders during the coming winter as a result of the general improvement in freights. The Globe Iron Works Co. is about to put down the keel for a steel barge of 366 feet keel, 44 feet beam and 26 feet hold, a vessel that will be practically a duplicate of the barges Antrim and Thomas, built by the same company recently. It is understood that the Cleveland Ship Building Co. also has an order practically in hand, and negotiations are pending in nearly all of the other steel yards.

Triple expansion engines and Scotch boilers for the two new wooden steamers under way at the ship yard of James Davidson, West Bay City, will be built by Samuel F. Hodge & Co. of Detroit. The contract was let to the Detroit firm several days ago. It is said that Capt. Davidson will probably put down as many as four more keels for big wooden vessels during the fall.

The announcement that the American Steel Barge Co. is about to put in tools to admit of repairs and alterations in machinery of vessels wintering at that point or needing repairs during the season of navigation, will very probably result eventually in a fully equipped machine shop for the building of engines being developed at the head of the lakes. The barge company is also to put in at once a number of pneumatic tools for work in the ship yard and dry dock.

The new Wolvin steamer Empire City, which is equipped with quadruple engines and Babcock & Wilcox water tube boilers, is also fitted with a mechanical stoker of Babcock & Wilcox design, which is said to work well and which is expected to reduce fuel bills and at the same time permit of the firing being done by ordinary labor. The device has not as yet been sufficiently tried to say much of its merits or disadvantages.

The Detroit Dry Dock Co. has given estimates to Seattle parties on a seagoing steamer to run from Seattle to Alaska, and on two light steamers to run up the Yukon. It is not probable, however, that the contract for these vessels will be let for some time yet. If it is secured by the Detroit Dry Dock Co. the small vessels would probably be built in Detroit and shipped in parts by rail to the Pacific, while the larger steamer would be built at Seattle from designs furnished by the Detroit firm.

A drill scow recently built in Cleveland by L. P. & J. A. Smith is at work on the Dunkirk government contract, and is expected to prove one of the most effective machines of its kind on the lakes. Dredging appliances of this kind are very costly on account of the powerful machinery—pumps, electric light apparatus, etc.—which they contain. The cost of this drill is understood to have exceeded $10,000.

Wm. Chace & Co., Chicago, have contracted to build some small stern-wheel steamers to tow barges on the Yukon and be transported there in sections.

A note in the Milwaukee Evening Wisconsin compliments Capt. J. G. Keith of Chicago on his able management of the whaleback passenger steamer Christopher Columbus during the past season. The Columbus will close the season between Chicago and Milwaukee on Sept. 7. She is due to arrive in Superior Sept. 12, and on the night of Sept. 14 will give a moonlight excursion on Lake Superior. On Sept. 19 she will run to the Apostle islands with an excursion. It is said that the passenger business of the Columbus during the season just closed has been greater than in any previous season since the World's Fair, and that she will no doubt return a handsome dividend to the stockholders of the Columbian Whaleback Steamship Co.

Buffalo has a new shipping firm that is undoubtedly the strongest organized at that port for a long time past. On August 30 John Gordon, J. H. Kelleran and H. L. Chamberlin joined interests in a firm of vessel, freight and insurance agents to be known as John Gordon & Co. Offices of the new firm are at 1132 Guaranty building. Each of the gentlemen has had extended experience in vessel and freight business. They are all well known throughout the lakes.

H. V. Winchell has an article in the September number of the Engineering Magazine on "Soft Ore Mining by the Methods of the Minnesota Iron Co."

Tonnage of the new Union Line steamer Starucca, built by the Union Dry Dock Co., Buffalo, is 3,114.05 gross and 2,117.56 net. Her official number is 116,786.

A Mass of Information on a Single Chart.

A pilot chart just issued by the United States hydrographic office contains more information regarding the lakes than has ever before been collected on a single sheet. To begin with, this publication, which is corrected two or three times a year, is an excellent chart of the entire chain of lakes, and then there is added in every corner of space all manner of information of value to vessel masters. The reverse side of the present issue, for instance, contains all of the tables of distances between lake ports, which were published on a special sheet some time ago. The White law in full (rules of the road for the lakes) and the rules governing navigation of the Sault river are also printed on the back of the chart. All this in addition to the regular tables giving dimensions of canals and dry docks, which have appeared on previous charts, but which have been revised and corrected to date.

But the most important new feature of the chart is the graphic method in which a valuable collection of information regarding fog is shown. In this regard the officials of the hydrographic office would seem to have anticipated a scheme just outlined by Prof. Willis L. Moore, chief of the weather bureau. Mr. Moore is now engaged in a tour of the lakes, making arrangements for the publication of a monthly chart giving information regarding fogs for a great number of years past, but it would seem that if he goes on with his plans the two departments will be engaged in a duplication of work along this line. The chart just issued by the hydrographic office shows graphically the proportion of days on which fogs occurred during the seasons of navigation for the past six years at each of the principal light stations on the lakes; the proportion of hours during which fog prevailed is also shown graphically. There is also a table giving, in figures, the occurrence and duration of fog at fifty-five stations of the light-house service on the lakes, from which the probabilities of fog during any month of the season of navigation at any light-station may be ascertained. The table gives in the case of each of these fifty-five stations the number of days with fog and the total number of hours during each of the eight months of lake navigation. From this data there is also shown the average number of foggy days at each of the stations throughout the season, the per cent. of foggy days and the total number of hours of fog. The chart sells at 50 cents and may be had from the Marine Review.

The iron trade has now fairly entered upon a season of larger consumption, and, as may be reasonably supposed, of somewhat more remunerative prices. The ease with which healthy improvement develops into an unhealthy boom is only too freshly in mind, but today there are no indications that the unpleasant experiences of 1895 and 1896 are to be repeated. The substantial character of the revival in all lines is recognized, and with such exceptional returns guaranteed to the forming community, it would be simply going in the face of all the history of such movements to suppose that the iron industry will not feel the effect of this stimulus for months to come. The outcome of the splendid trade in cereals now enjoyed by the United States, no one can predict; but better prices for iron products are naturally looked for. And that this prosperity may be a sustained, gradually broadening movement, is certainly the desire of the entire trade. Kept free from the restraints of ill-considered combinations, the trade should expand, securing advances by the natural operation of the law of supply and demand. Looking forward to the business of next year, as many are already doing, there must be the extreme of conservatism and restraint on the part of the producers of raw materials, or the prospect that now seems to be opening up will quickly give way to hesitancy, reaction and defeat.—Iron Trade Review.

Although it was thought that the full stretch of channel down the Detroit river from Bois Blanc island to Bar point light was fully deep enough for any vessel that could get over Ballard's reef, the steamer Griffin struck a shallow spot near the light-ship in this channel on Sunday last. The Griffin was drawing only 17 feet 2 inches, but the wind changed and the water dropped 2 feet or more after she left Ballard's reef. She was delayed two or three hours, but suffered no damage, as the bottom in the channel is a mixture of sand and gravel. The shallow spot will undoubtedly receive the attention of the engineer in charge of the river work.

The matter of establishing a signal service at Johnson's point, Sailors' Encampment, Sault river, has been formally submitted to both the treasury department and the light-house board by Capt. Davis and Commander Folger, who have been in correspondence on the subject with Geo. L. McCurdy of Chicago and Capt. Gorge P. McKay of Cleveland. It may be that a special service suited to the prevention of accidents at this point will be undertaken by the revenue cutter officials, but if not the underwriters stand ready to provide such a service.

Capt. L. A. Rand of the steamer City of Rome reports to Geo. L. McCurdy of Chicago that when coming by the stake at the north end of Russel's island, St. Clair river, Aug. 29, bound down, he struck bottom at least 150 feet northeast of the lake. His vessel was drawing 16 feet 6 inches. He is of the opinion that this stake should be shifted at least 200 feet farther to the northeast.

It is understood that if George H. Worthington of Cleveland succeeds in selling the sail yacht Priscilla, he will build or buy a fast steam yacht, in the ownership of which he will be joined by the gentlemen associated with him in the Priscilla.

Five steamers which are in course of construction for the Hamburg-American line are to be named Assyria, Belgia, Brasilia, Bulgaria, and Pretoria.

John F. Wedow of the firm of Mitchell & Co., Cleveland, has the sympathy of a very large circle of acquaintances on the lakes, in the loss of his oldest daughter, an estimable young lady of twenty years, who died on Friday last.

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

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The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross Tonnage.
Steam vessels	1,792	924,630.51
Sailing vessels and barges	1,125	354,327.60
Canal boats	416	45,109.47
Total	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30.	1891	204	111,856 45
" " "	1892	169	45,968.98
" " "	1893	175	99,271.24
" " "	1894	106	41,984.61
" " "	1895	93	36,352.70
" " "	1896	117	108,782.38
Total		864	444,216.36

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (*From Official Reports of Canal Officers.*)

	St.Mary's Falls Canals.			Suez Canal.		
	1896*	1895*	1894	1896	1895	1894
Number of vessel passages	18,615	17,956	14,491	3,409	3,434	3,352
Tonnage, net registered	17,219,418	16,806,781	13,110,366	8,560,284	8,448,383	8,039,175
Days of navigation	232	231	234	365	365	365

*1895 and 1896 figures include traffic of Canadian canal at Sault Ste. Marie.

Saginaw bay lumbermen profess to care little for the threats from Canada of retaliation on account of our new tariff law, but it would seem that the logging interests of Lake Huron are too important to be dealt with quite as lightly as they have been in some of the lumber journals on this side of late. A Saginaw correspondent in one of the Chicago papers says: "Not much apprehension exists here as to the talk in Canada regarding an export duty on logs. Although the Georgian bay lumbermen who live in Canada are red-hot for retaliation, they will cool down later on. The Ottawa men are opposed to an export duty, for they understand it means bankruptcy if they are prevented from marketing their product in the states, and the Canadian banks will hardly favor an export duty on logs. If it should be attempted the people who are interested will bring pressure to bear to bring up the Canadian railroads with a round turn by stopping the transit of goods in bond, and there are some other things up the sleeve of the lumbermen here if their Canadian cousins get cantankerous and attempt to slop over. Retaliation is a two-edged sort of weapon. Once invoked there is no telling where it will stop, and the assurance is satisfactory that in a deal of this kind the American isn't going to come out second best."

England has been showing her ship yards to visitors from all over the world during the jubilee year. The king of Siam with his suit visited the Elswick yard of Sir W. G. Armstrong, Whitworth & Co., a few days ago, and saw under construction eighteen vessels of war with an aggregate displacement of 100,000 tons. This was in addition to several mercantile vessels under construction at another yard operated by the company. It was stated that the company employed about 24,000 men, exclusive of workmen in mines or collieries, and that there were at present in course of manufacture at Elswick 1,380 guns in various calibres up to 12 inches. The eighteen naval vessels included one armor-clad battleship of 14,800 tons and 18 knots speed; one armor-clad battleship of 12,200 tons and 18 knots; two first-class armored cruisers, each of 9,600 tons and 20 knots; one first-class armored cruiser of 8,500 tons and 20 knots; two fast protected cruisers, each of 4,500 tons and 24 knots; two fast protested cruisers, each of 4,300 tons and 23½ knots; one fast protected cruiser of 4,250 tons and 21 knots; two armor-clads, each of 3,800 tons and 17 knots; three fast protected cruisers, each of 3,450 tons and 20 knots; one third-class cruiser of 2,800 tons and 18 knots; one training ship of 2,500 tons and 14 knots and one torpedo-boat destroyer of 300 tons and 30 knots.

Not long ago the revenue cutter officials in charge of the Sault river assessed heavy fines against a Cleveland steamer for violation in two instances of the rule limiting the speed to 7 miles an hour between the western end of the St. Mary's Falls canal piers and Big point. The matter was settled by a reduction of the fine in each case of $10. In defense of his action the captain of this steamer made certain claims that will interest other vessel masters and which should receive the attention of the revenue cutter officials. Some time ago the treasury department issued a circular showing the time required in covering stretches of the river to which the speed rule applies. In many cases these circulars, reproduced in large type, were hung up in the pilot houses of steamers trading to Lake Superior. Unfortunately, they contained no reference to the stretch of river above the canal, between the piers and Big point, to which the speed rule is applied in the special law governing the navigation of the St. Mary's river. The failure of the treasury department officials to include this point in the circular referred to would certainly seem like an omission on their part.

The Maritime Register describes a buoyant propeller, which, it is said, does not cause any vibration in the vessel it is driving. It consists of a cylinder carrying propeller blades secured by angle irons, to which the roots of the blades are rivited, each blade being so constructed that the pitch of every part of it is uniform. The propeller shaft passes through the stern frame as usual, being one or two conical plates fixed, one on each side of the hull, to guide the water to the blades, the plates forming together a cone, the large end of which has the same diameter as the cylinder. Similar conical plates are also fixed to the stern frame behind the propeller, the small ends of these plates being cut away sufficiently to allow of the movement of the rudder between them.

The very small percentages of aluminum which are found to have a beneficial effect on steel are remarkable. The amount usually added is but 2 ounces to 4 ounces, or at most 5 ounces of aluminum per ton of steel. This amount, small as it is, is stated to increase materially the soundness of the ingots, and the metal pours much more quietly. Too large a proportion of aluminum leads to piping of the ingots, thus leading to waste. Aluminum will, it appears, alloy with iron in all proportions, but, except in small proportions named, does not give rise to useful alloys. An alloy of equal parts of iron and aluminum casts solid, but will shortly after crumble to powder spontaneously.

Capt. Oberlin M. Carter of the army engineer corps, who was recently honored by appointment to the Nicaraugua canal commission, is only forty-one years of age. He graduated from the military academy in 1876. Rear Admiral John G. Walker, president of the commission, was retired from the navy on March 20 of this year at the age of sixty-two. Prof. Lewis M. Haupt, the civilian member of the commission, is also a West Point graduate, but was in the army for only a short period. He is eminently fitted for the position. His father, Col. Herman Haupt, has been for half a century one of the best known civil engineers and railroad men in this country.

October and November are the months in which severe storms most frequently occur on the Lakes. In these fall storms on lakes Erie and Ontario, the wind almost invariably commences at the southeast and works round through south to west and northwest, and the time of the hardest blow is usually when the barometer begins to rise as the wind gets around to the west. On Lake Huron and in Georgian Bay, the wind, though for the most part changing as on the lower lakes, not unfrequently changes with great suddenness, chopping after a lull from south-southeast to northwest, and blowing hardest, as a rule, from the northwest.

Members of the Marine Engineers' Beneficial Association will be pleased to know that District Deputy N. K. Ludlow of Mobile, Ala., recently instituted M. E. B. A. No. 104 at Moss Point, Miss., with thirty-five charter members. The following officers were elected and installed: H. D. Coulson, president; C. R. Router, vice-president; J. H. Blumer, recording and financial secretary; D. E. Morris, corresponding secretary; T. A. Coulson, senior conductor; C. G. Johnson, chaplain, and W. B. Crosbie, door keeper. The address of the corresponding secretary is D. E. Morris, Moss Point, Miss.

If it is true, as reported from Sault Ste. Marie, that something like $15,000 will be spent during the coming winter on different parts of the appliances used in the operation of the new 800-foot lock in the American canal, it would seem that there is some cause for the claim that an advantage would have been gained in the application of electricity to some parts of the machinery.

All of the steamboat companies carrying passengers on the lakes report a very large increase in tourist and excursion travel which is now practically at an end. The season of 1897 has been the most profitable in the history of lake passenger business. Cheap rates have prevailed on nearly all of the lines but the great volume of passengers have made up for the reduced fares.

Armor Plate Board.

With the conclusion of their inspection of the plant of the Illinois Steel Co., the naval officers who compose the board recently appointed by Secretary Long of the navy department to consider the question of erecting a government armor plant, are about ready to return to Washington and begin preparation of their report. It is, of course, not within the province of the board to recommend the construction of a government plant. That is a matter to be determined by the secretary of the navy upon receipt of the conclusions of the board regarding the cost of making armor. Before leaving Chicago, Commodore J. A. Howell, president of the board, said:

"I think we have all the necessary information about the condition of the industry in this country. As the board includes a chief engineer of the navy, whose work has to do with machinery, and a civil engineer, we have the necessary technical knowledge among our own number. However, if it seems desirable, we shall also secure the services of other experts. In a short time the report will be ready to go to the secretary of the navy, and he can take whatever action with it he pleases. We shall say nothing at all in the report about a site for the factory. We shall confine ouselves to reporting the cost of producing steel armor plates."

Directors of the Maine Steamship Co., Portland, have voted to contract at once for the building of another steel steamer somewhat larger than their latest successful boat, the John Englis. The new steamer is to be ready for service between New York and Portland early next summer.

New Nicaragua Canal Commission.

Among the contributed articles in the Review of Reviews for September are sketches of the three members of the new Nicaragua Canal Commission—Admiral Walker, U. S. N., retired; Capt. O. M. Carter, corps of Engineers, U. S. A., and Prof. Lewis M. Haupt of Philadelphia. The sketches are illustrated with portraits, and serve to convey an idea of the peculiar qualifications possessed by these gentlemen for the task to which they have been appointed by President McKinley. The sketches were written by Henry W. Lanier, who says that Prof. Haupt's view on the canal scheme are eminently broad. He believes it unquestionably should and will be built. Its exact location and cost, while most necessary of determination, can in no way affect this general conclusion. Whether it costs a hundred million more, as Senator Morgan declares it will, or a hundred and thirty-three million, as colonel Ludlow has estimated, or even two hundred million, is in a broad view immaterial. It represents a colossal annual saving which the world of commerce has a right to expect and to demand, and of its profitableness he himself has not the slightest doubt. The opposition to it which has been industriously fomented by some of the trans-continental railroads is peculiarly short-sighted on their part, for the transportation experts agree to the truth of the apparent paradox that water competition is decidedly beneficial instead of injurious to the railroads.

Prof. Haupt is quoted as follows: "Look over the stock market and select the roads whose stock is away above par; in nearly every case you will find these lines compete with deep-water traffic. Railroads which are paying dividends are running in competition with water in every case. The explanation of this is found in the facts that facilities increase commerce, that a large local trade is stimulated by the canal, and that the railroad gets the bulk of the refined and manufactured products which go through the canal in their raw states. The tonnage in sight for this proposed waterway is nearly as great as that carried annually by the Suez canal, the profits from which are said to pay for its initial cost every five years. It is stated by French economists that the benefits conferred upon that republic by the expenditure of over $700,000,000 upon her system of free canals and water-ways is equivalent to an annual return of 5 per cent. upon this enormous capital, and it was reported by the United States senate committee on commerce, in 1892, that the saving on transportation effected by the St. Mary's Falls canal was over $100,000,000 in two years. The same report states 'the total expenditure for water improvements of the lakes has amounted to about $30,000,000, or approximately to one-fifth of the annual saving in transportation.'"

Higher Prices for Iron of all Kinds.

It would seem that the upward movement in all branches of the iron industry is at last initiated. Making due allowance for the effect of economies introduced at every point during the past three or four years, the fact remains that prices have been unduly low. This is true of iron ore for which there is no remedy for the present. It is probably not the case in coke, which, however, may be one of the first articles to rise. Otherwise, it seems certain that we have been on an abnormal basis. There can be no profit to even the best equipped plants in $13 billets, of which large quantities have been sold. Furnacemen could not cover real cost when selling Bessemer pig at a shade under $9 in the central west, as they have done not long since. The rolling mills have sold at prices which would be ruinous in the long run. In order to get to a normal basis the advances must be cumulative along the line, and must also provide for higher wages to much of the labor employed, particularly if the cost of living shows a tendency to increasing, as seems likely. The general improvement is beginning to tell, even now, in different ways. The question of a car supply is growing troublesome, and in some districts common labor is beginning to get scarce at the wages paid lately. All this means delay and an increased cost of production. In the territory west of the Alleghany mountains the large steel producers who have been leading the markets for years have booked so heavily at low prices that they are asking, and are getting, $1.25 to $1.50 per ton above the lowest prices for what material they are willing to sell for the next few months. Since the famous 100,000-ton sale of wire rods in the Chicago district there has been considerable activity, and moderate lots, which were selling at $19 two weeks since, cannot now be purchased for less than $21. Negotiations are again pending on a pool for the rod makers, the scheme this time being even more comprehensive than that which came so near succeeding in the early summer. It is significant that the demand is so very heavy in the wire trade, because that branch depends more than any others upon the prosperity of the agricultural community.—Iron Age.

Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, August 28, 1897:

	Wheat, bushels.	Corn, bushels.
Chicago	1,760,000	13,011,000
Duluth	348,000	138,000
Milwaukee	84,000	100,000
Detroit	301,000	47,000
Toledo	707,000	392,000
Buffalo	727,000	605,000
	3,927,000	14,293,000

As compared with a week ago, the above figures show, at the several points named, an increase of 13,000 bushels of wheat and 1,419,000 bushels of corn. On the same date there was afloat on the lakes 1,830,000 bushels of wheat, 5,621,000 bushels of corn and 1,935,000 bushels of oats. Grain afloat on the canals aggregated 133,000 bushels of wheat, 1,539,000 bushels of corn, and 158,000 bushels of oats.

Army and navy charts of the lakes are kept in stock by the Marine Review, Perry-Payne building, Cleveland.

Ship Building in Germany.

Reports from various sources would indicate that ship building enterprises in Germany of late have increased on a very large scale. New ship yards are being erected, old ones extended and the majority of them appear to be well occupied. At the beginning of the present year there were in course of construction in German yards an aggregate of 275 vessels, of which 175 were steamers, thirteen sailing vessels, thirty-nine lighters, etc., and the rest smaller craft. Of these vessels 250 were being built of steel, tweny of wood, and two of iron. Forty-four of the steamers and six sailing vessels were intended for trans-atlantic traffic. There were not less than seven steamers in course of construction of more than 10,000 tons; six of these were for account of the North German Lloyd's, and comprised a couple of the longest and fastest steamers afloat. Between 5000 and 10,000 registered tons there were five, and eleven of 2000 to 5000 tons. An important feature in connection with German ship building is the rapidly increasing number of fishing steamers, about thirty being in course of construction at the beginning of the year. The Hamburger firm of Blohm & Voss stood at the head, as regards tonnage, having during 1896 constructed or taken in hand twelve Transatlantic steamers. Next comes the Vulkan company of Stettin with eight steamers, some of which are of unique dimensions. The well-known Schickau yard had also undertaken the construction of steamers of unusual size, but in addition they had been busy with torpedo boats, having built some half dozen for the German navy. Of the Bremen firms the Weser ship yard had on its list, besides several cargo steamers, a cruiser for the German navy. The Government dock yards have in hand the three largest ships of the German navy, the one at Wilhelmshafen two, and the yard at Kiel one. The two first-class ironclads will have three propellers, and are in many respects built on similar lines. There was, further, in hand at Kiel a fourth-class ironclad, and at the Danzig dock yard a sister ship. Five cruisers of the second class are being built, two at the Imperial dock yard at Danzig, two at the Vulkan ship yard, Stettin, and one at the Weser ship yard, Bremen. The Vulcan yard also has in hand three protected cruisers for the Chinese government, and the Shickau yard some torpedo catchers and boats for the Austrian government.

Report of Another Northern Line Combination.

If late reports from Chicago regarding certain railway combinations are to be credited, Mr. J. J. Hill of the Great Northern Railway and Northern Steamship Co. is constantly strengthening his lake interests. Comment on the recent advance in securities of the Chicago & Great Western Railroad is attended by the report that the J. P. Morgan interest, which is now in full control of the Northern Pacific, and the James J. Hill party, which owns the Great Northern railway system, are now in possession of options representing controlling interests in the Great Western. This, it is said, will perfect a formidable combination which will minimize the competition in the carrying trade of the northwest. The Chicago & Great Western will give the Northern Pacific-Great Northern interest its own line from St. Paul to Chicago. It is proposed by the new combination to make an attempt to control the trans-Pacific carrying trade by means of an alliance already perfected and in operation with the Nippon Yusen Kaisha, or Japan Mail Steamship Co., which has the largest fleet and the second largest tonnage rating of any steamship company in the world. In joining this alliance the Japanese steamship company brings to its partners a monopoly of the interior and coasting trade of Japan and China, and also places in service connecting lines of steamships to compete for the Indian, Australian, Hawaiian and Northern Asiatic trade, with the object of diverting to the United States route the English and continental European traffic for India and Asia, which has heretofore gone via the Cape Town or Suez canal routes.

The lake and rail business of the combination is to be thrown to the Northern Steamship Co. via Duluth. The latter company, as an ally of the Great Northern system, with the Eastern Railway of Minnesota, which extends from St. Paul to Duluth, has also passed under the control of the syndicate. East of the all-rail terminus at Chicago and east of the lake and rail terminus at Buffalo, the traffic of this big combination will, it is said, be thrown to those roads in which the Morgan interests predominate.

Canal Regulations.

During a recent visit to Sault Ste. Marie Col. Lydecker thoroughly inspected the working of the locks and incidentally discovered that some of the vesselmen were not complying with the rules and regulations governing their conduct while in the canal. To avoid unpleasant friction with many of the vesselmen, Supt. MacKenzie and his assistants have not rigidly enforced certain of the rules. For instance, when captains were ordered by the watchmen at either entrance to the canal to stop at a certain point, or place their craft in a certain position, some of them have paid but little attention to the orders. Other regulations have been also practically ignored. Col. Lydecker promptly gave instructions for the absolute enforcement of the rules hereafter. When the vesselmen have been given sufficient notice of the new order of things, they will suffer a penalty if the regulations are disobeyed by them. Contingencies may arise at any time whereby serious accidents are quite liable to result to the boats and also to the canal in the event of the rules and regulations not being adhered to.—Sault Ste. Marie News.

It is understood that pending the erection of a permanent system of lights on Grosse point channel, Lake St. Clair, the light-house board will probably authorize the district officers to change the lower cluster light to red, and to place a white lens-lantern on a cluster directly opposite, to mark the turn and the width of the channel.

The draft of water at Ballard's reef during the week ending on Saturday last was as follows: Monday, 18 feet, with wind north, light; Tuesday, 18 feet, south, moderate; Wednesday, 18 feet 1 inch, north, light; Thursday, 18 feet, south, light; Friday, 17 feet 8 inches, north, light; Saturday, 18 feet 2 inches, south, moderate.

The Review has excellent photographs of lake ships.

Around the Lakes.

Work on the concrete breakwater at Marquette has been suspended for the season.

George Goble of Oswego has sold the schooner West Side to Minnie E. Edwards and others of Chicago for $2,000.

Charles Kimball, light-keeper at Whitefish point, has been selected to take charge of the light-house exhibit at the Tennessee exposition.

Lieut. Hawley of the navy is still engaged in securing recruits at Detroit. It is expected he will be in Cleveland during the coming week.

Buoys in the Hay lake channel, near Rains' dock, will be given their new positions for the contemplated channel on or about Saturday, Sept. 4.

Owners of the steamer Susquehanna ask for $9,000 damages from the owners of the steamer Ira H. Owen, with which she collided on July 27.

The Excelsior Foundry Co. of West Bay City, which suffered quite a loss on account of fire in its plant some time ago, is again ready for business with a new foundry.

The death of Capt. Frank H. Park of the Mutual line steamer Corona is announced from Amherstburg. Although only thirty-four years of age, Capt. Park had commanded some of the best freight steamers on the lakes. Paralysis was the cause of death.

It is announced from Sault Ste. Marie that on his recent visit to the canal Col. Lydecker decided to increase the lock force so that in the near future both of the locks will be in readiness for operation at all times. For some time past, only the Poe lock has been in operation.

There is probably no truth in the report from Toledo that Wheeling & Lake Erie railway officials are preparing for the movement of all of their lake coal from Toledo, as it is known that the railway company owns the car dumping machine recently constructed at Huron.

Ill health has compelled Capt. Timothy Le May to relinquish command of the steamer John Oades to Capt. A. A. Parker. Capt. Albano now sails the Rhoda Emily in the stead of Capt. George McCullough, and Capt. Beggs the steamer Britannic in the stead of Capt. E. H. Davis.

It took four tugs seventeen hours to reach the lake from Sixteenth street at Chicago with the big steel steamer City of Bangor. The steamer had a cargo of 175,000 bushels of corn on board and drew 17 feet 1 inch forward and 18 feet 4 inches aft. The cargo was the largest ever moved out of the Chicago river.

Capt. Christian Anderson, who for nearly twenty years had charge of the light-house at Manitowoc, died on Tuesday, aged about seventy years. The captain's health has been failing for some time, and last winter he was compelled to retire from the light-house service. He was an honest and faithful official.

The secretary of the treasury has remitted several fines imposed upon Michigan vessel owners by local inspectors of steamboats. One was in the sum of $100 against G. W. Parker of Port Huron, who on August 13 last carried a second mate to Nipigon, Ont., when his license only allowed him to go as far as Detour.

Johnston Bros. of Ferrysburg, Mich., are building for Lydon & Drews, Chicago dredging contractors, two steel dumpscows, each 115 feet long, 28 feet wide and 10 feet deep; capacity about 450 cubic yards each. They are also building for the same firm a fire box boiler, 7 feet diameter and 18 feet long, for a large new dredge, which the firm is building at Chicago.

A circular from the light-house board gives notice that the brick dwelling, including the tower and light, at the Sand point light station, west side of L'Anse bay, Lake Superior, is being moved 200 feet directly west from its old location and that the light will be exhibited in its new position on Sept. 15. The structures will remain in all other respects as heretofore.

Wreckers are still at work on the Pewabic, blasting away portions of her hull, but they have secured only a small quantity of copper and have thus far obtained little from their labors, except the distinction of having found the famous old wreck that had for so many years defied the efforts of others to locate it, and the advertising that has been awarded gratis by the newspapers to their peculiar style of diving bell.

Captain J. H. Green, of the steamer Scranton, has notified the Cleveland hydrographic office that the spars of the sunken schooner Ellsworth, which is in the track of vessels rounding Waugoshance from McGulpin's point, Straits of Mackinac, are still attached to the wreck. One large spar, hanging top-end down, floats with about 10 feet out of water, at such an angle as to endanger the hull of any ship that might strike the spar end on.

A contract has been let by Maj. Sears, United States engineer at Duluth, to John N. Dennis for the construction of a pile and stone dike 800 feet long at the north end of the north pier of the Superior entry, running northward parallel to the shore of the lake and at right angles to the pier. There were six bidders, and the amounts ran from Dennis' bid of $4,995 to $11,000. The object of this improvement is to prevent the sea from cutting a channel through Minnesota point at the base of the pier.

Wreckers on the tug Wright have succeeded in raising and delivering at Sturgeon bay both boilers from the burned and sunken wreck of the Australasia in Whitefish bay. They have also secured the steam steerer, fan and engine, steam capstan, boiler arches, steam fitting, coils, pumps, condenser, hawsepipes, iron towposts and a score of other things. The wreckers are now removing the working parts of the engine, and purpose also to recover the shaft and wheel.

At last accounts the waterlogged schooner Banner, which was abandoned by her crew on Lake Michigan several days ago, was about five miles off land at a point W. S. W. from Pentwater and N. N. W. from Little Point Sable. The hydrographic office sent out a notice of the wreck, but it would seem that some means should be provided for the removal of obstructions of this kind. It seems that the captain, who owned the vessel, was unable to find funds to send a tug in search of her.

A contract for furnishing metal work for a beacon at Grand Marais light-station has been awarded to the Russell Wheel & Foundry Co. at Detroit. The light-house board rejected the bids opened at Detroit for the metal work of the light-house at North Manitou, Mich. The board awarded contracts for the metal work for the light-house at Sturgeon bay canal and Devil's island, Wis., to John P. McGuire of Cleveland (Variety Iron Works) at $7,990 and $7,350 respectively. Bids for the North Manitou station will be again advertised.

Officials of the Buffalo Forge Co. are pleased with the adoption of their specialties in revenue cutters, torpedo boats and many of the public buildings. A note from the Buffalo office of the company says: "Our machinery is now used by the United States government in its postoffices and other public structures of the larger and better class. Buffalo fans, engines and heaters are widely adopted for the heating and ventilating plants. Among work now under way is the apparatus for the postoffice at Washington, consisting of three large special steel plate fans in the three-quarter housing type, capable of delivering a total of 300,000 cubic feet of air per minute, each fan having a suitable direct attached horizontal engine of the center crank type, with cast iron subbase. The court house and postoffice at Omaha, Neb., are being similarly equipped. The United States revenue cutters and torpedo boats also afford opportunity for the use of our specially designed fans and engines. A number of orders in this line are now in process, the most recent being for the United States torpedo boat No. 17. Electric light plants of the government, both on shipboard and land, are a field for the introduction of Buffalo automatic engines. There are several forms of single and double types. A recent introduction is the open marine frame, which for direct-connected work is meeting with wide sale. The center crank self-oiling enclosed horizontal type is a favorite for larger plants.

A new steamer, the twelfth in the fleet of the Merchants and Miners' Transportation Co., Baltimore, has just been launched by the Harlan & Hollingsworth Co., Wilmington, Del.

Lists of names of captains and engineers of lake ships, appointments of 1897, may be had from the Marine Review for $1. Vest pocket size.

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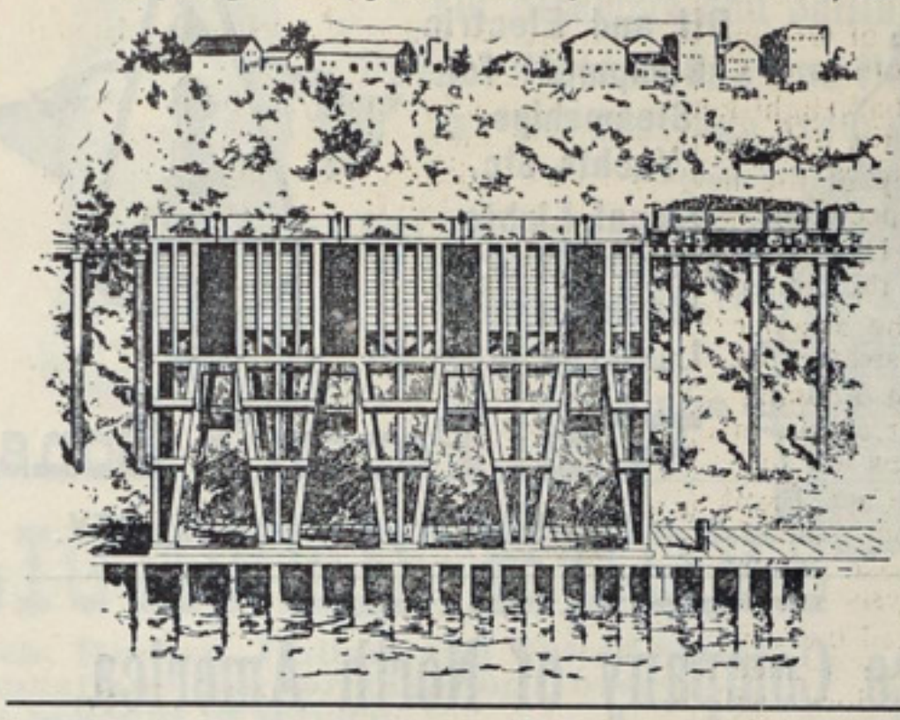

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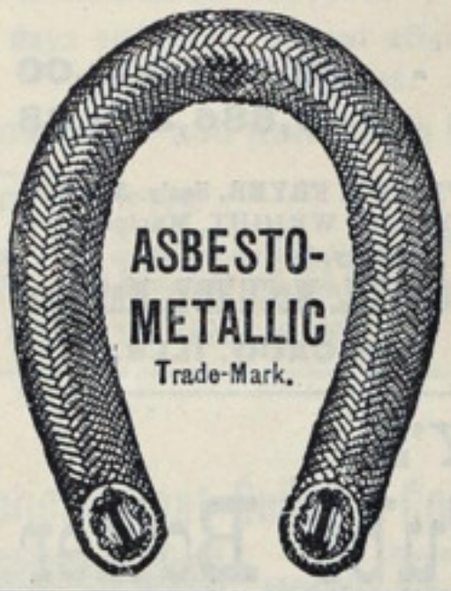

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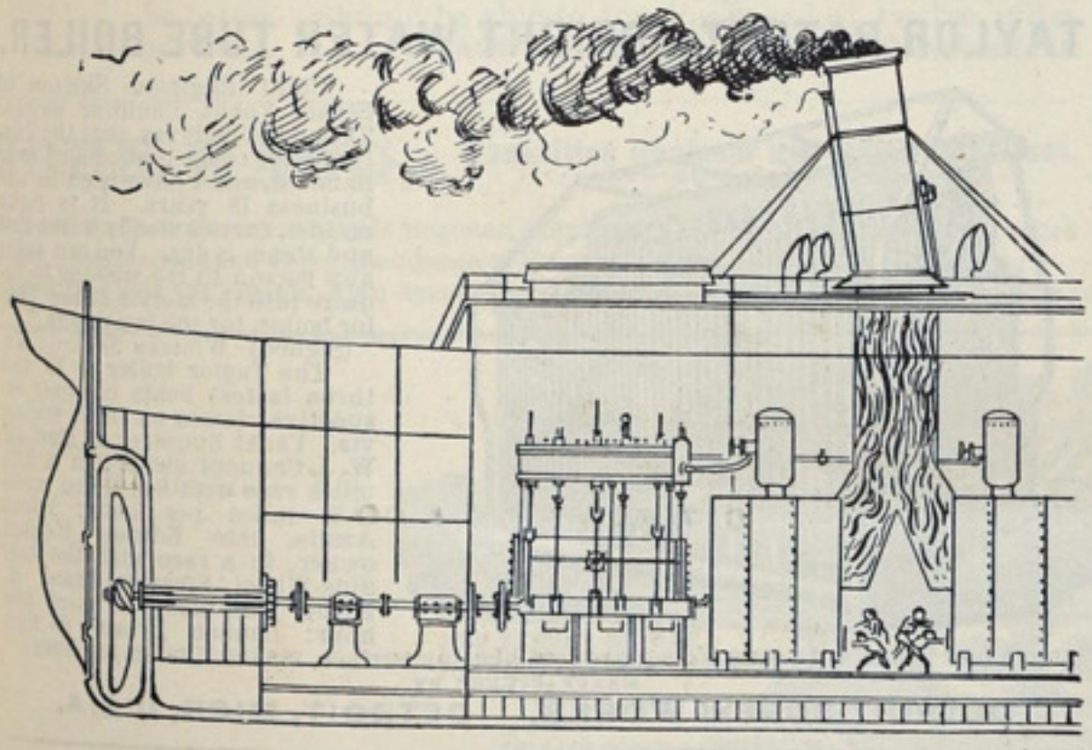

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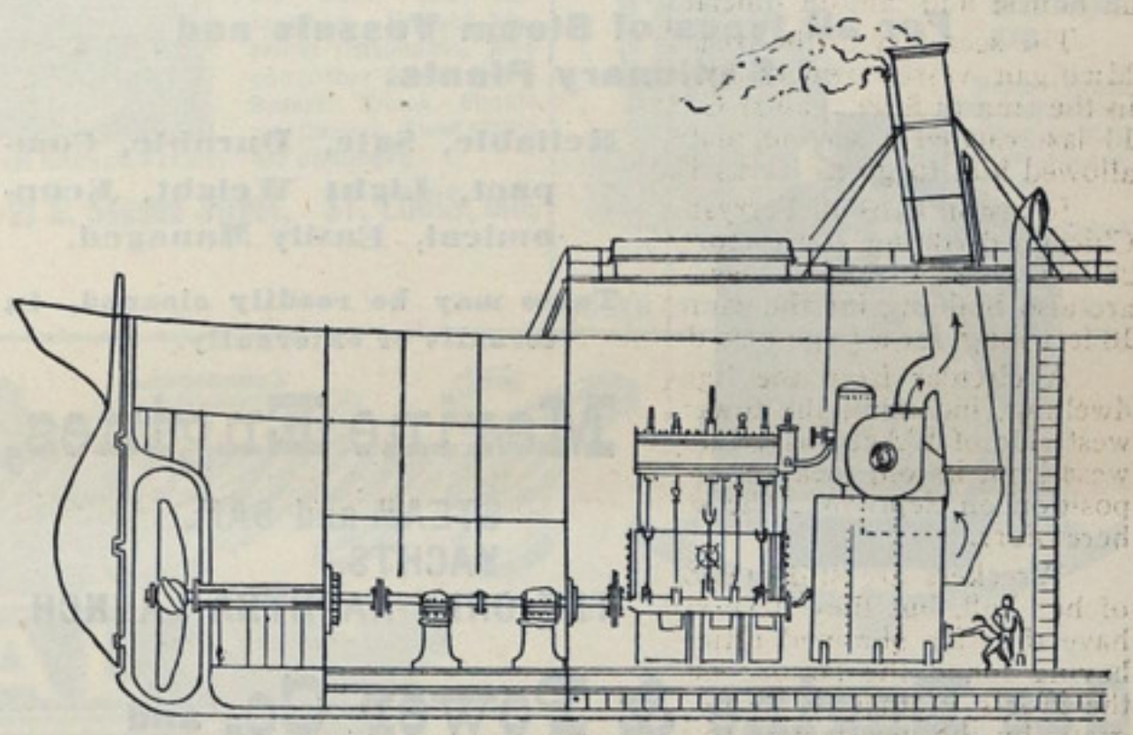

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Oils	15	14				15	14			
Repairs	1	00				1	00			
Supplies	11	66	$376	41		11	66			
STEWARD'S DEPT.										
Provisions	119	20						289	26	
Supplies	3	37	122	57				122	57	
Handling Cargoes (unloading)	364	40								
Hull Repairs	20	25								
Towing	12	00								
Chandlery	1	38								
Sundry	13	15	411	18				411	18	
WAGES—ELEVEN DAYS.										
Captain.....$175.00 per mo.	64	16				64	16			
Mate.....80.00	29	33				29	33			
2d Mate.....56.00	20	54				20	54			
2 Wheelmen.....34.00 (12.46)	24	92				24	92			
2 Lookouts.....34.00 (12.46)	24	92				24	92			
1st Engineer.....112.50	41	25				41	25			
2d Engineer.....80.00	29	33				29	33			
2 Greasers.....34.00 (12.46)	24	92				24	92			
3 FIREMEN.....34.00 (12.46)	37	38				37	38			33⅓
4 Deck-hands.....17 00 (6.23)	24	92				24	92			
1st Cook.....60.00	22	00				22	00			
2d Cook.....17.00	6	23	349	90		6	23	349	90	
Total Expenditures			1260	06				1172	91	

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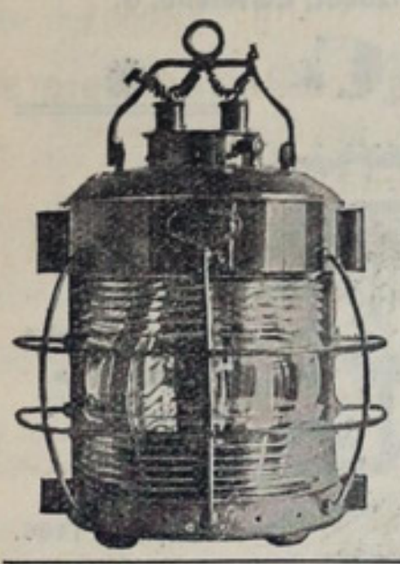

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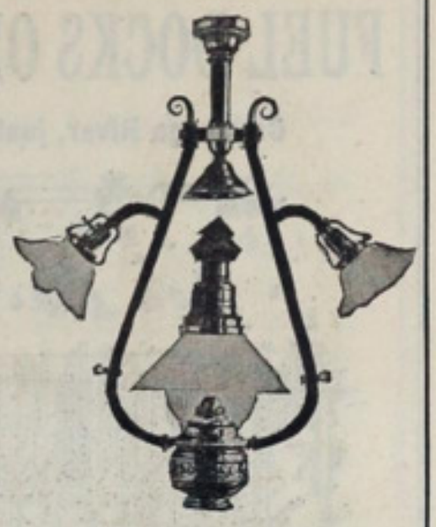

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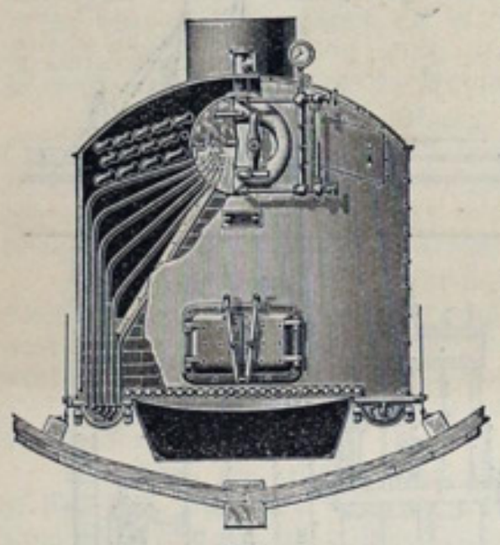

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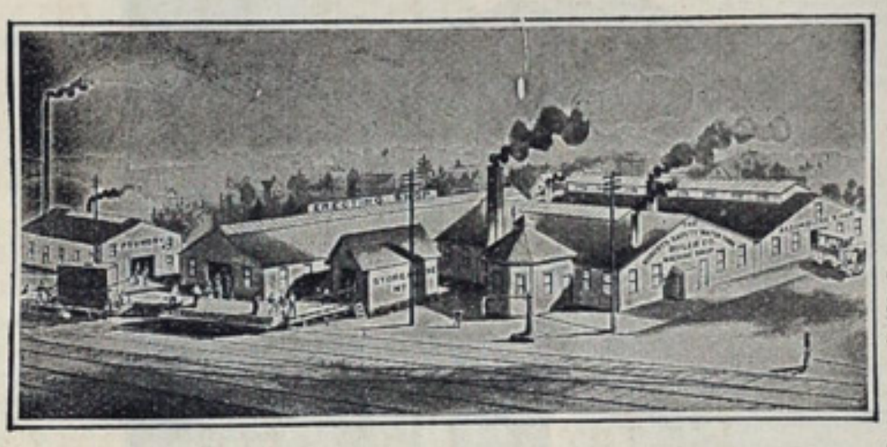

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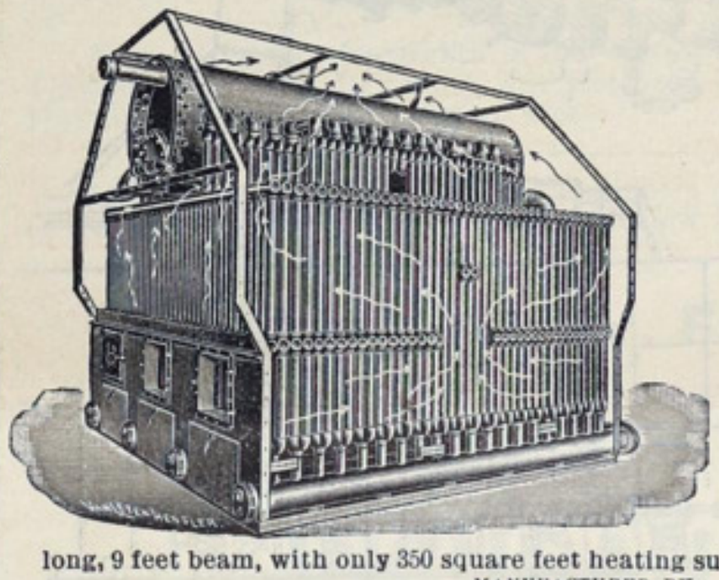

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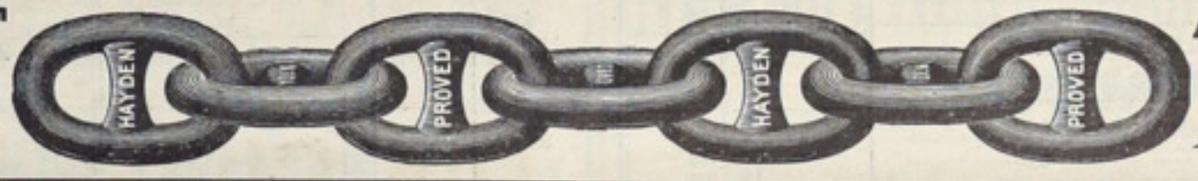

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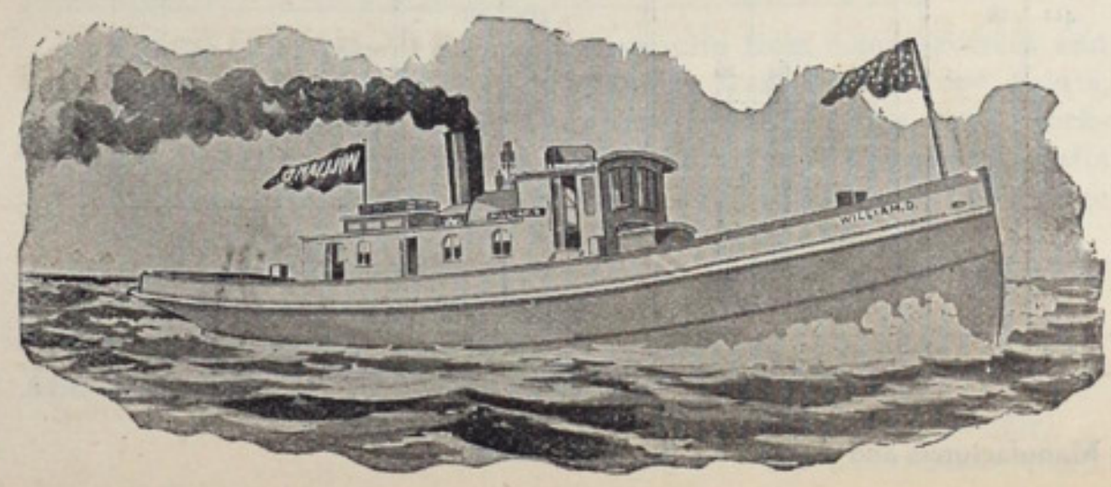

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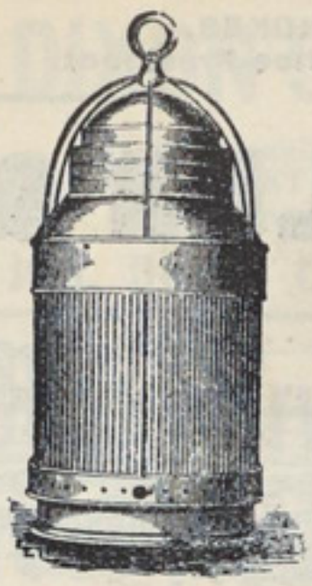

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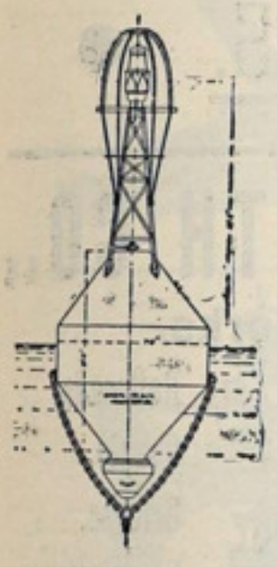

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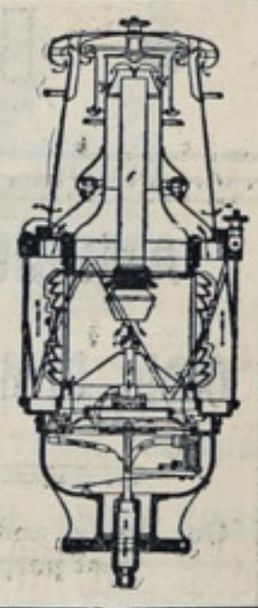

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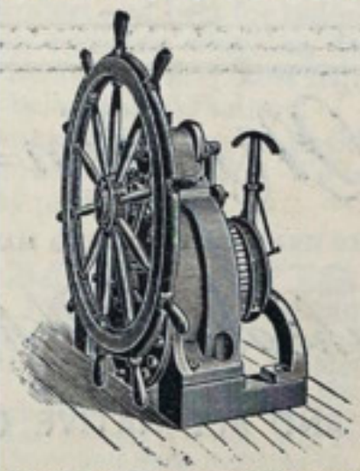

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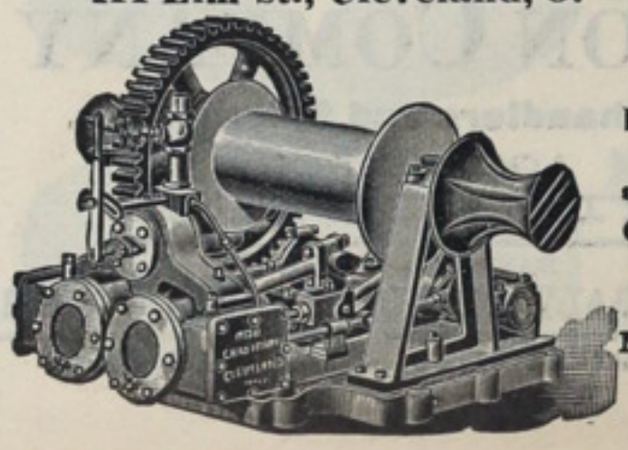

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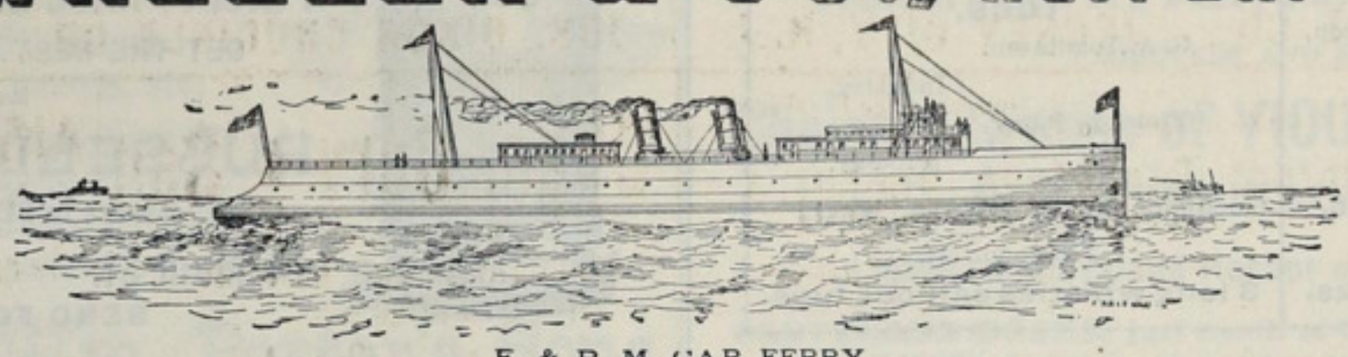

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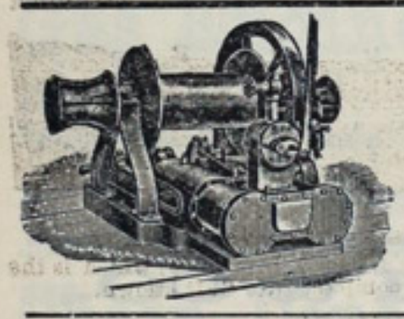

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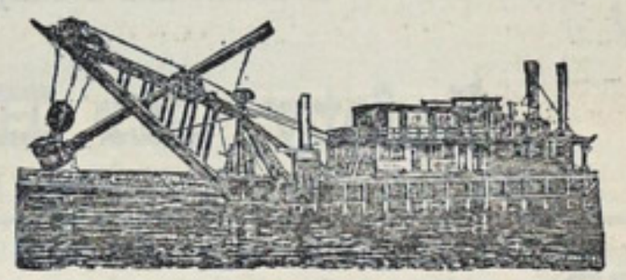

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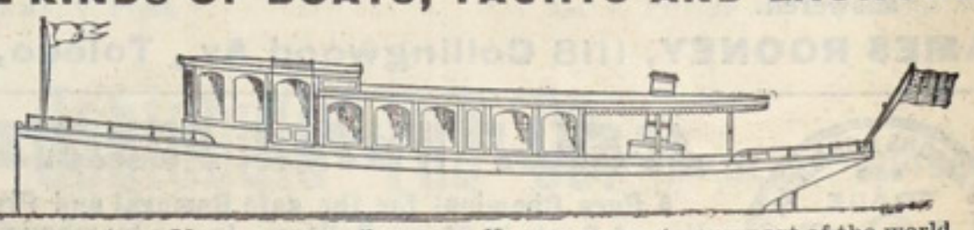

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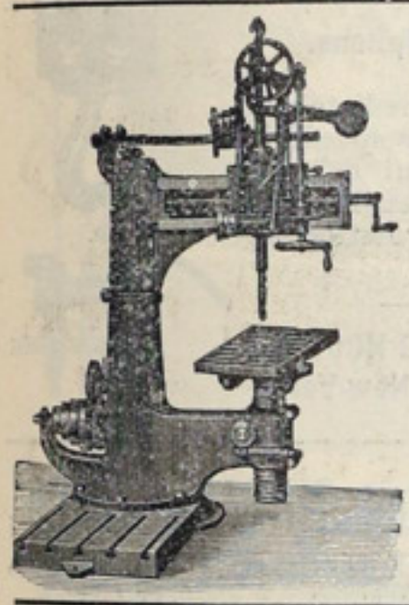

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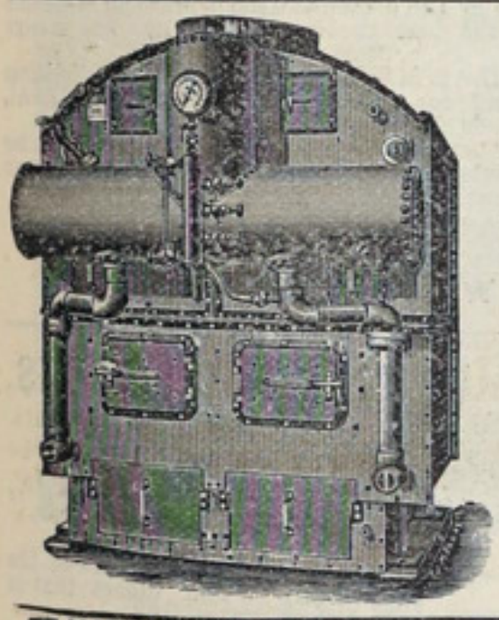

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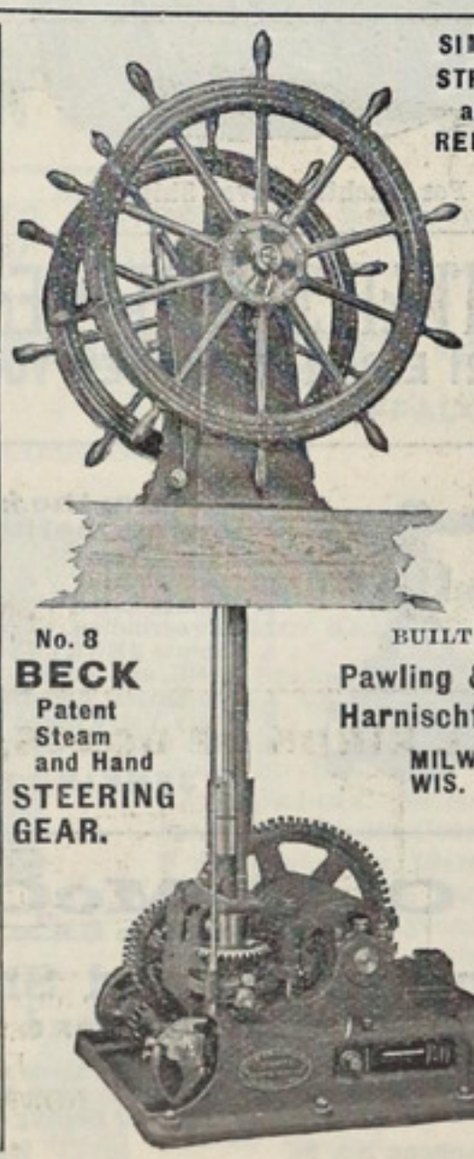

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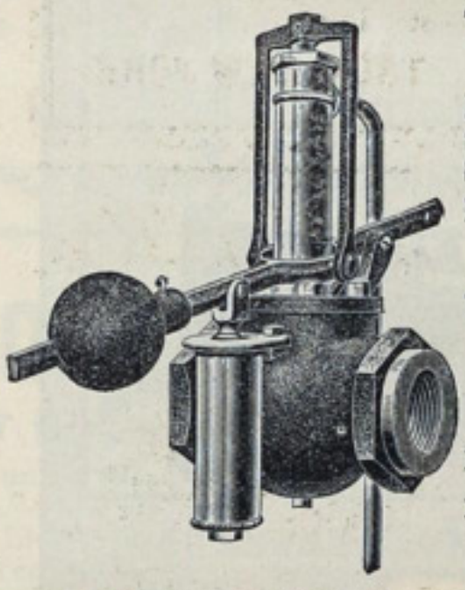

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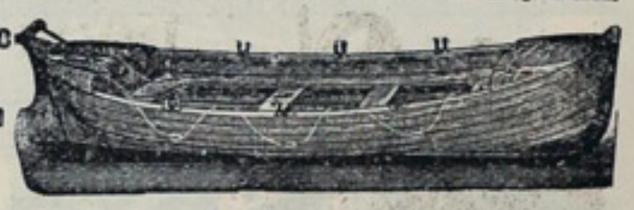

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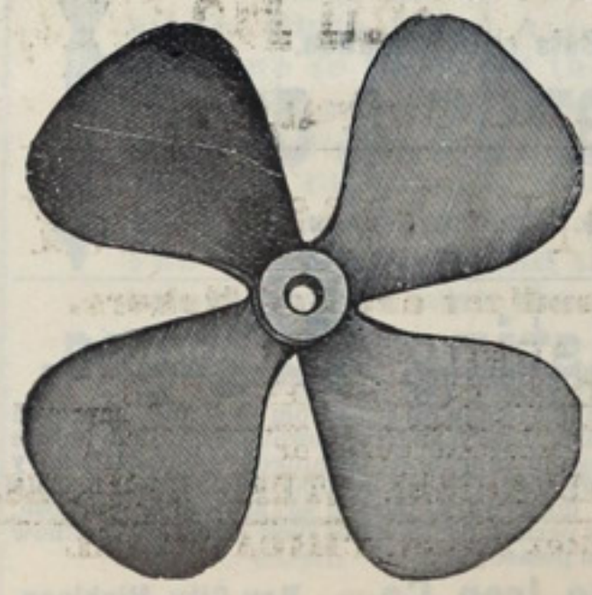

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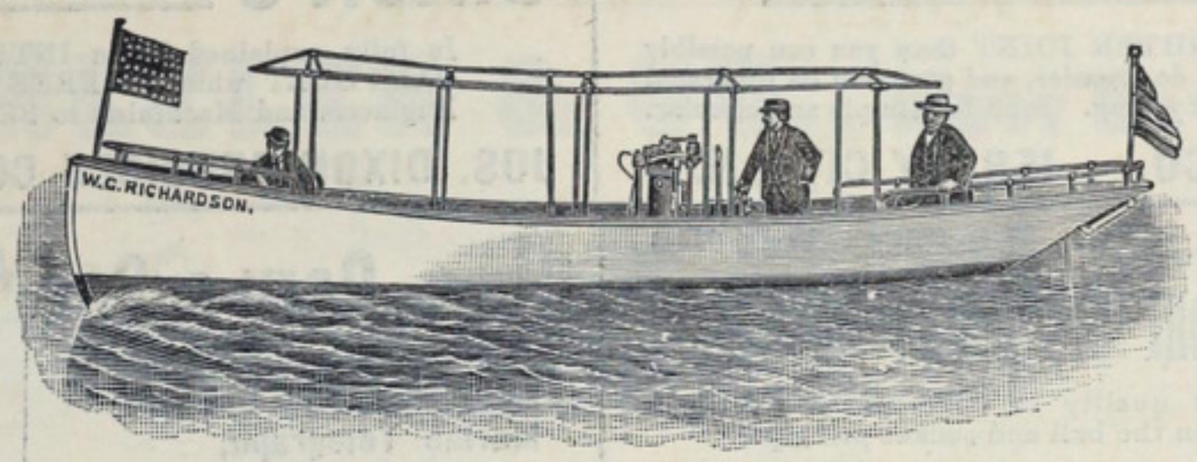

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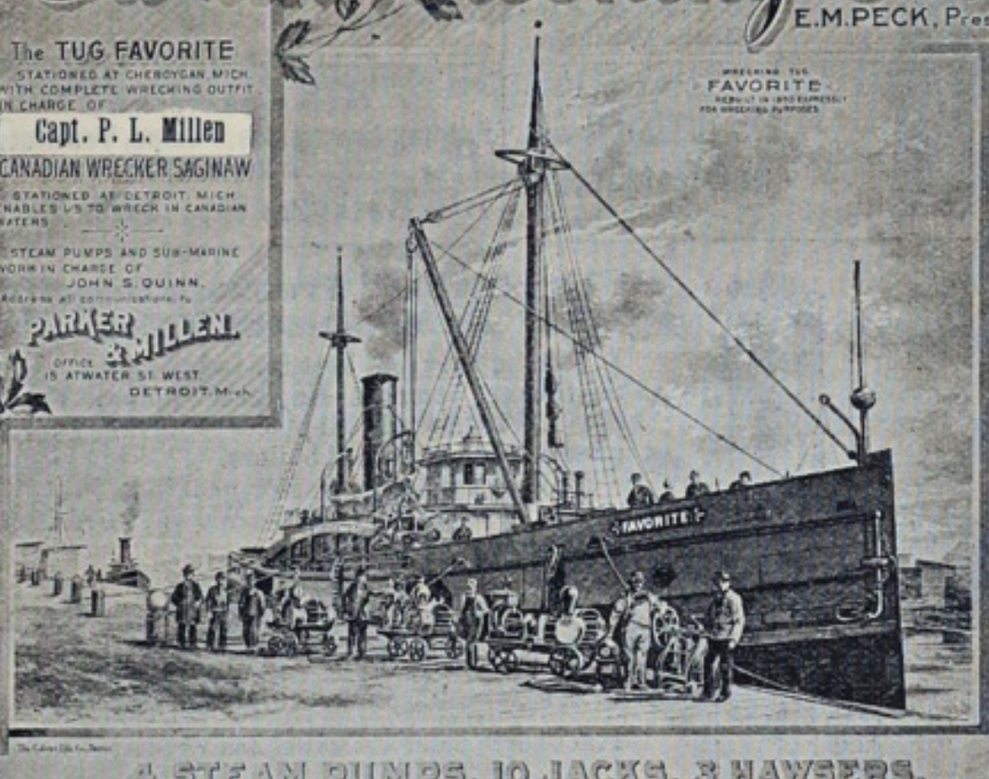

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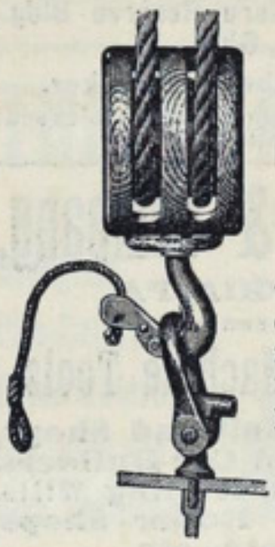

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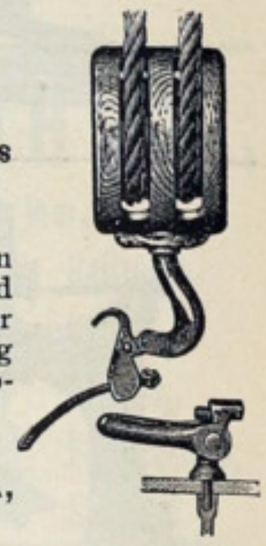

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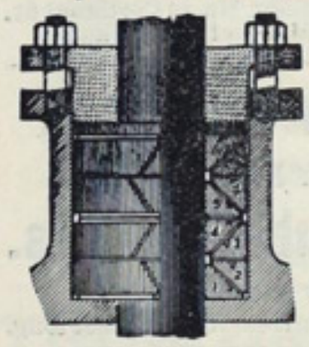

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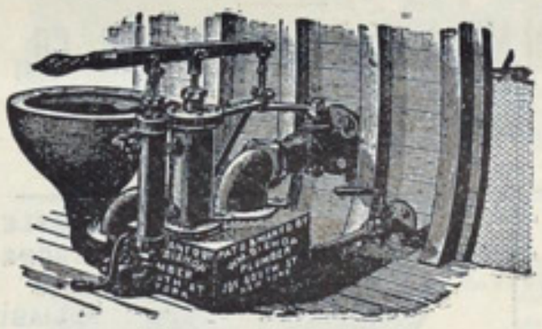

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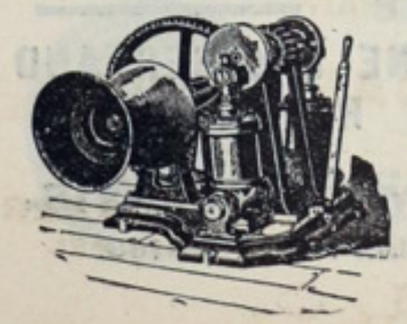

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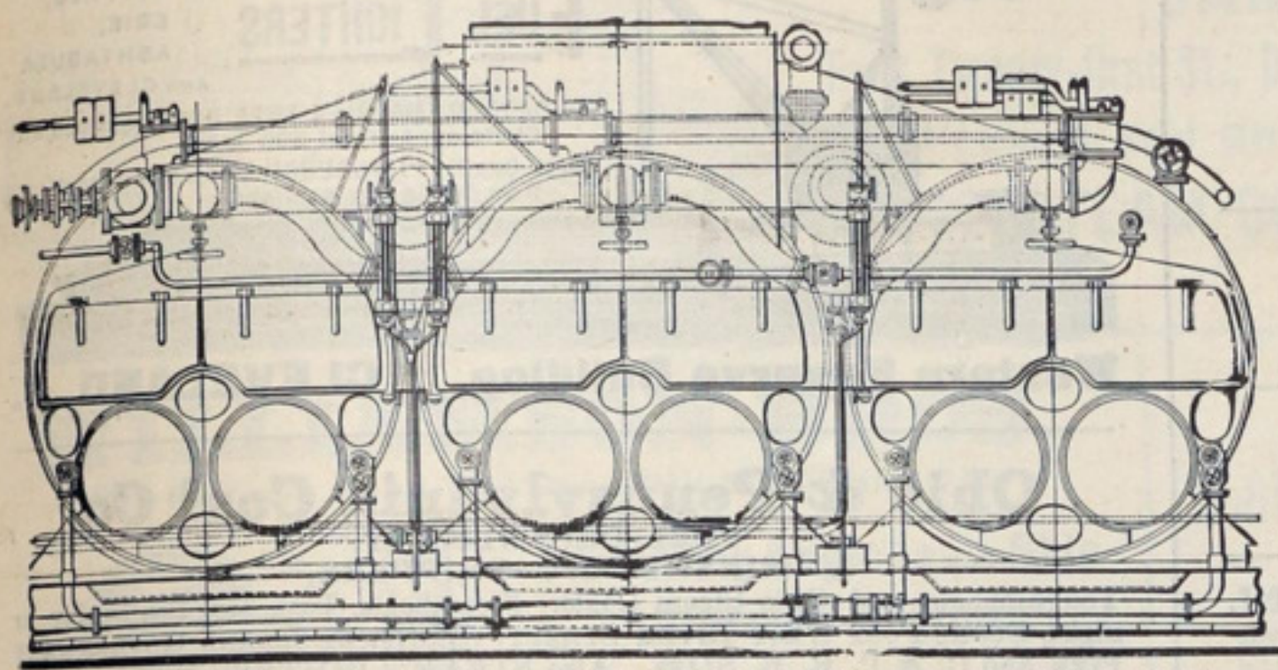

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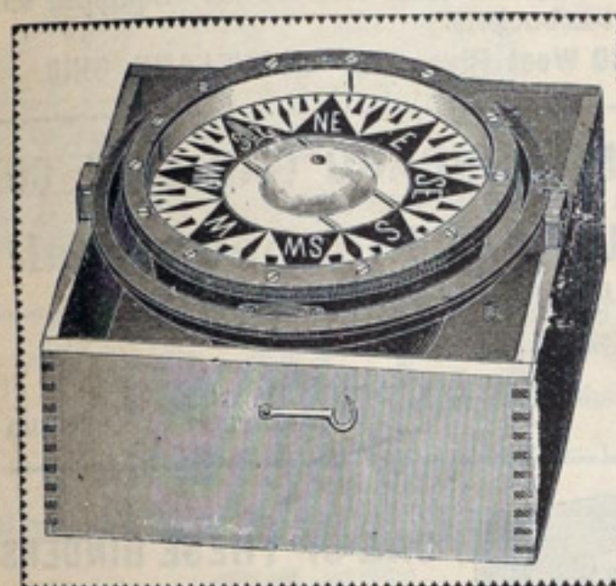

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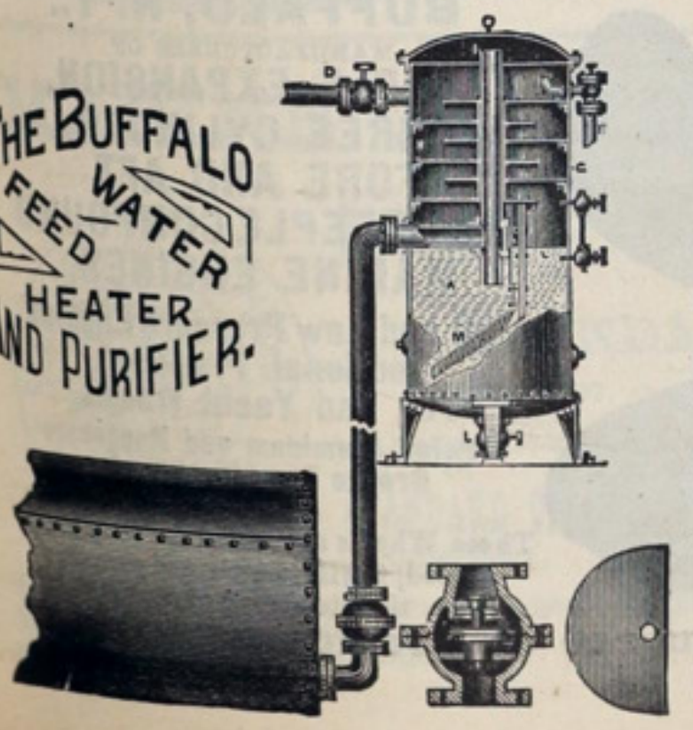

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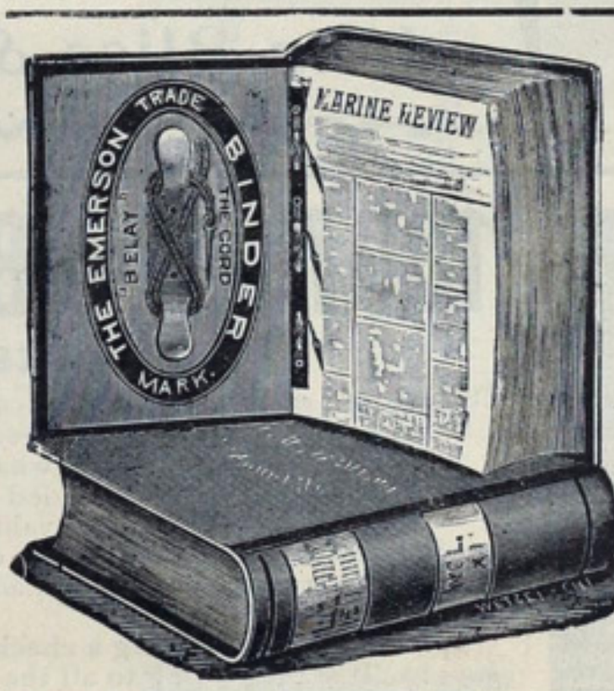

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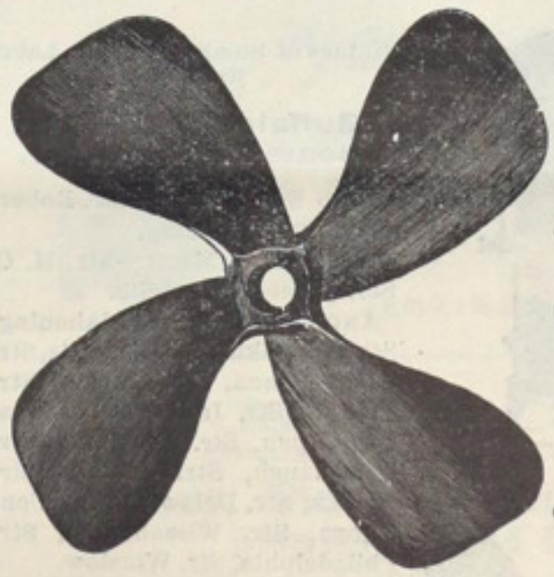

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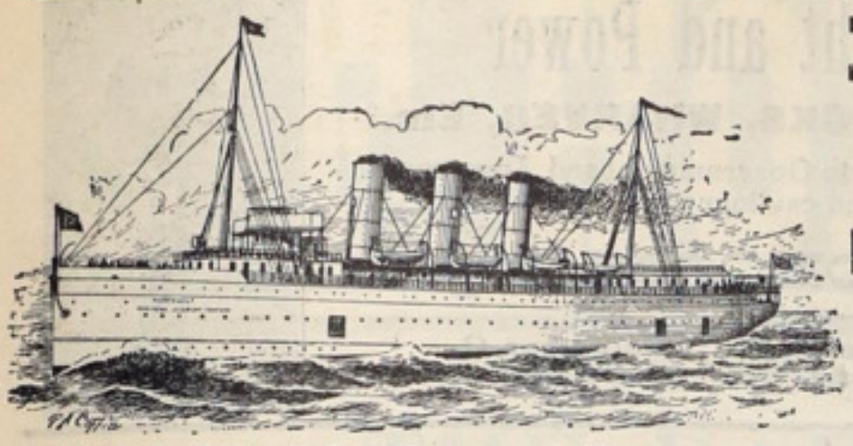

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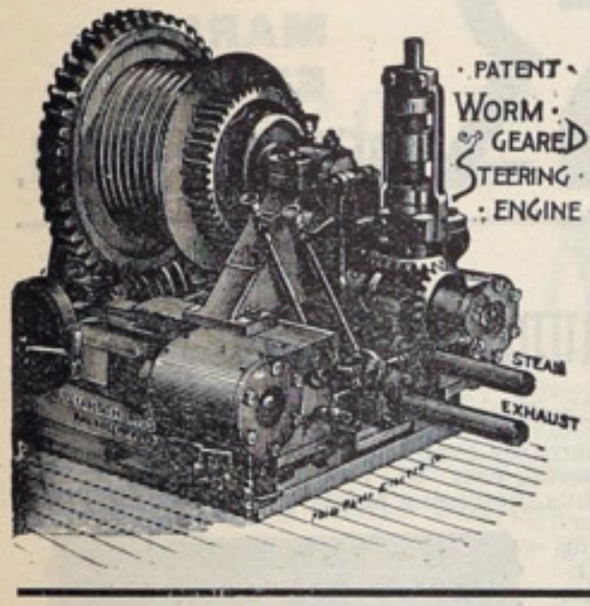

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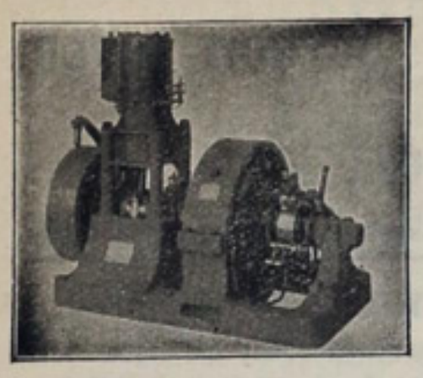

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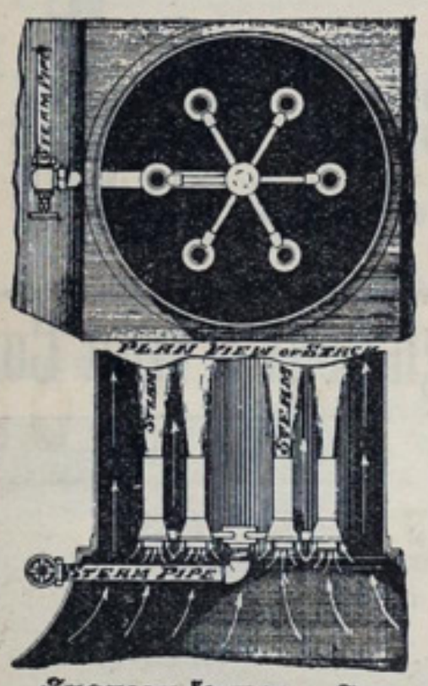

SECTION VIEW OF STACK SHOWING JET IN OPERATION.

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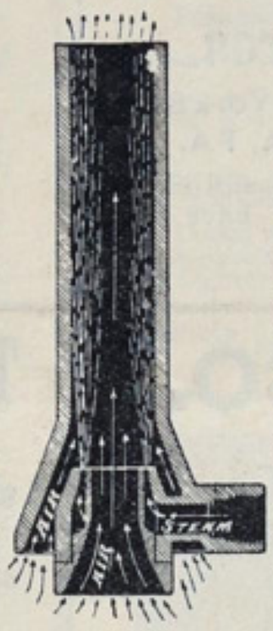

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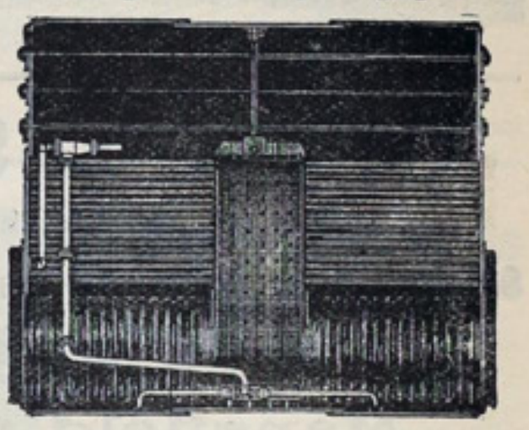

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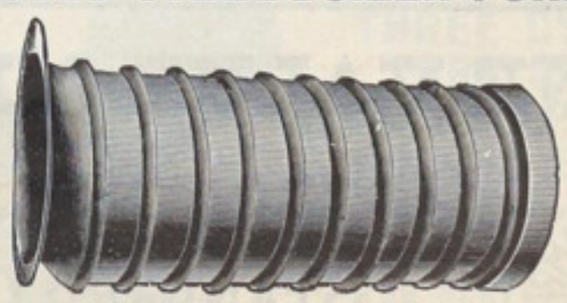

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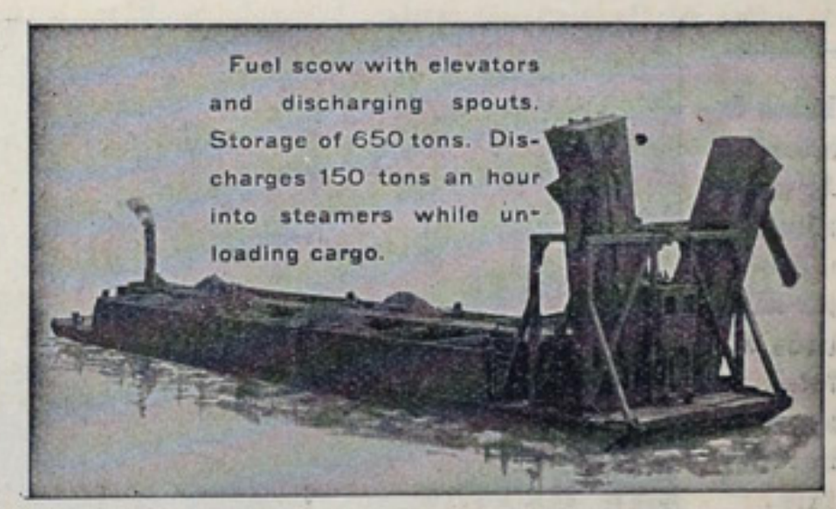

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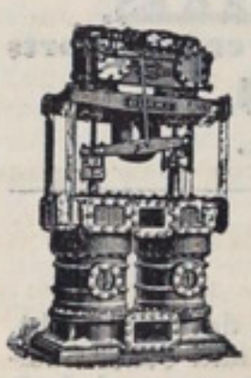

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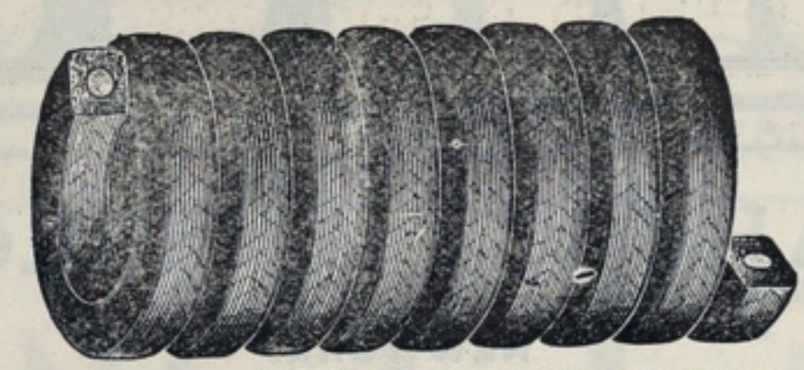

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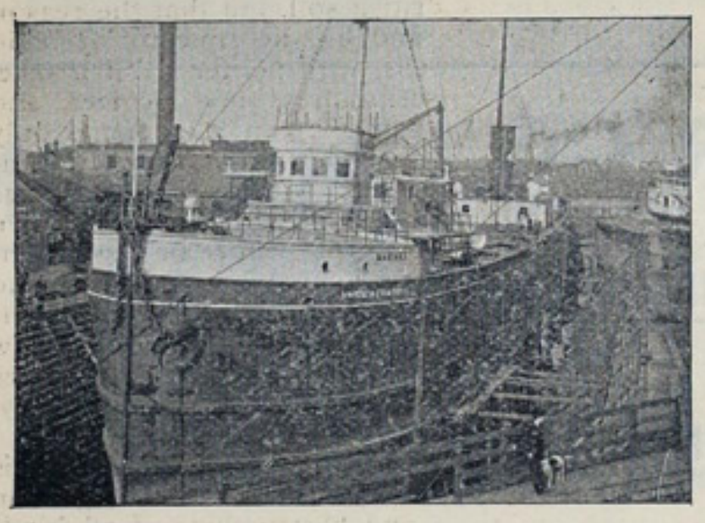

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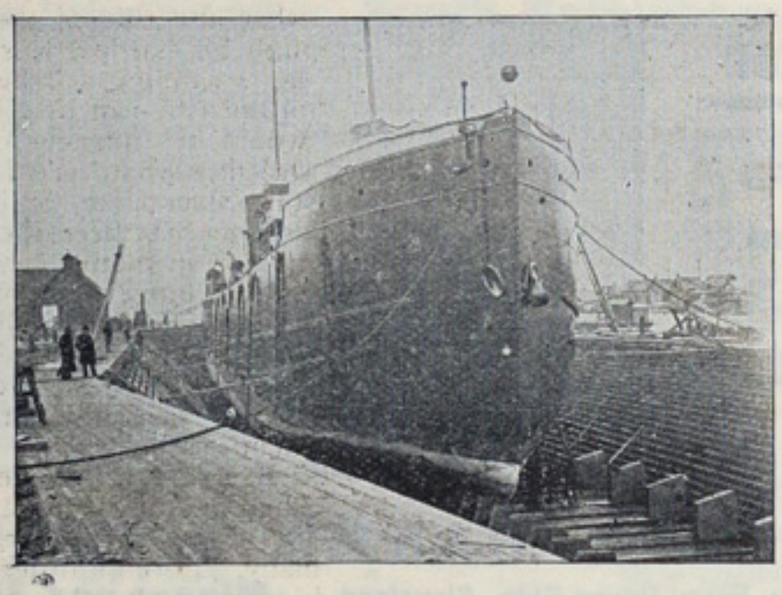

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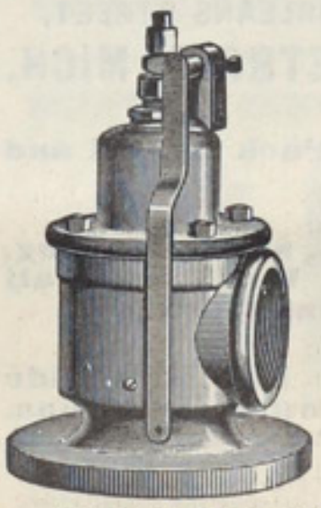

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